The Figwort Family of British Columbia

Handbook

33

by T.M.C. Taylor

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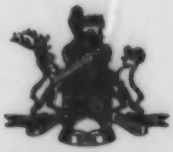
HANDBOOK No. 33

The Figwort Family
(Scrophulariaceæ)
of British Columbia

By T. M. C. Taylor
Illustrations by Elizabeth J. Stephen



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BRITISH COLUMBIA
DISTRICTION MAP
ALASKA
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THE FIGWORT FAMILY (Scrophulariaceæ) OF BRITISH COLUMBIA

INTRODUCTION

The Scrophulariaceæ or Figwort Family, as it is sometimes called, contains more than 200 genera and nearly 3,000 species. It is a cosmopolitan family with representatives on all continents, although most of the larger genera are found in the Northern Hemisphere. Plants of this family attain their greatest development in warm temperate climates, from where they range to arctic and antarctic regions as well as into the tropics. It is a family made up mostly of herbs and small shrubs, with a few climbers. Of biological interest is the fact that species of many genera are semi-parasites. There is nothing in their appearance in the field, however, to suggest this departure from normal behaviour because they have the green colour of physiologically independent plants. Careful excavation of their root systems will sometimes reveal attachments to the roots of neighbouring plants. Apparently the parasitic relationship is not with particular host species but largely a matter of chance.

The variability of flower types found in the Scrophulariaceæ is great and hard to describe. The accompanying plate includes a selection (Fig. 1). They range from radial symmetry in *Verbascum* (*f*) to marked bilateral symmetry in *Castilleja* (*a, b*). The corolla is made up of 5 fused petals, the tube being very short (as in *Veronica* (*e*) and *Verbascum* (*f*) or long and conspicuous (*Penstemon* (*j*) and *Digitalis* (*c*); bilateral symmetry is due to the development of a 2-lipped corolla (*Castilleja* (*a, b*), Penstemon (*j*), and others). The relative sizes of the two lips and their general appearance also shows great variability, e.g., in *Castilleja* the upper lip is elongated and beak-like (the galea), while the lower lip is much shorter and may be quite insignificant in size. In most cases bracts are present, usually brightly coloured in *Castilleja*. The stamens also show variability between genera. They arise

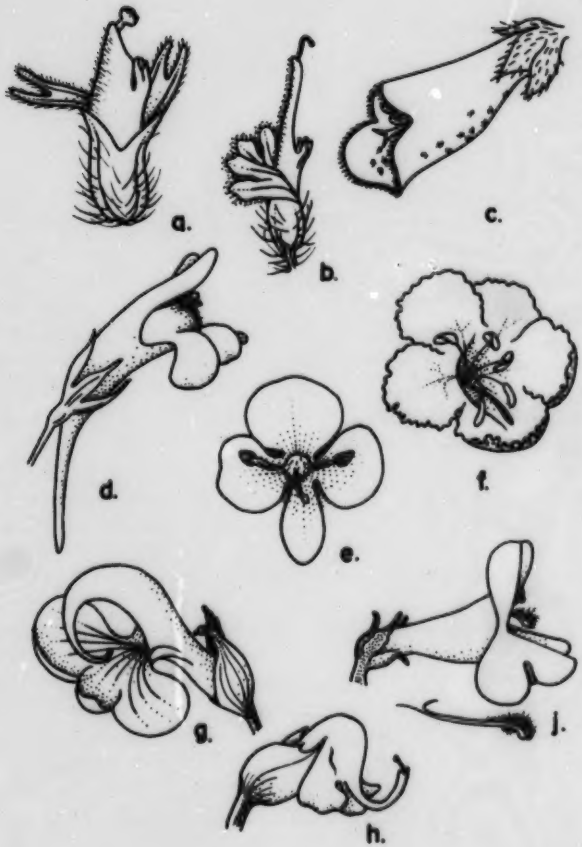


FIGURE 1

Some flower types in the Scrophulariaceæ. (*a*) *Castilleja raupii*, (*b*) *Castilleja miniata*, (*c*) *Digitalis purpurea*, (*d*) *Linaria vulgaris*, (*e*) *Veronica filiformis*, (*f*) *Verbascum phlomoides*, (*g*) *Pedicularis racemosa*, (*h*) *Pedicularis grænlandica*, (*j*) *Penstemon nitidus*.

from the base of the corolla tube, are 5 in number in *Verbascum* (*f*), all with pollen-bearing anthers; in *Penstemon* (*j*) only 4 are pollen bearing, while the anther of the fifth fails to develop, resulting in a "sterile" stamen or filamentous staminode; in *Veronica* (*e*) only 2 stamens are developed, both pollen bearing. Despite the considerable variation in flower structure, the fruits (in our representatives) are uniformly capsules.

Economically this is not an important family; *Digitalis* gives us the well-known drug, digitalis, while species of a number of genera are cultivated, notably *Antirrhimun, Digitalis, Mimulus, Penstemon,* and *Veronica.*

Among the species described in this handbook, those of *Castilleja* in particular, show considerable variation in many of the characteristics useful for identification. This makes identification, especially when dried and pressed, difficult. A further complication is that many species are likely to change colour somewhat in drying. The collector, therefore, will find subsequent identification easier if he notes the colours of fresh specimens and includes extra flowers that can be boiled later and dissected for their details.

The main purpose of this and other handbooks in the series is to aid in identifying species. Ready reference is simplified by an alphabetical arrangement throughout. Illustrations, with details of flowers, have been included for each species. These have been carefully drawn by Elizabeth J. Stephen, who deserves thanks for the great contribution she has made to the usefulness of the handbook. For further assistance, distribution maps have been provided for each species. The dots on the maps are based on specimens in the collections of the Department of Botany of the University of British Columbia and of the Provincial Museum. There is nothing final about the distributions shown by these maps. They are simply indicators of what is known at present about the occurrence of the various species in the Province. The Museum welcomes any additional distributional data, supplemented by specimens. These should be directed to the Curator of Botany.

A glossary will be found at the end of the booklet which should help clarify some of the more unfamiliar technical terms used in the descriptions. Scientists are often accused of using a great deal

of jargon. The justification for using such special words is two-fold, brevity and precision of meaning, the latter being most important.

Some readers may wish additional information on some of the species described, therefore a list of references is included on page 233. Special mention must be made of the recently completed five-volume work *Vascular Plants of the Pacific Northwest*, edited by Prof. C. L. Hitchcock, of the University of Washington, Department of Botany, and the more recent single volume by Hitchcock and Cronquist *Flora of the Pacific Northwest*. The former work, in addition to full descriptions, distribution data, ecological, and other information, also includes detailed drawings and full nomenclatural details for each species. It is an indispensible reference for the vascular plants of our area. The *Flora* is essentially a well-illustrated key to the plants of the Northwest and as such is unique. There is no doubt that it will be of great help with the identification of most species. Botanists in the Pacific Northwest owe a great debt to Dr. Hitchcock and his collaborators for their scholarship and imagination in presenting such a wealth of information in a manner so readily understandable.

Critical monographers nearly always find it useful to subdivide species into smaller units such as subspecies and varieties. These categories are based on minor morphological differences usually related to differences in range and sometimes ecology. The value of this handbook would not be greatly increased by including such additional information, therefore these details are omitted. Those concerned should consult one of the reference books listed on page 233.

Botanists are frequently criticized for constant name-changing. The critics are usually exasperated amateurs who do not understand the principles that underlie the whole system of plant naming. This, however, is not an appropriate place to discuss such an important matter, suffice to say that each species can only bear a single valid name, and this in general is the one with seniority over other names that may have been given to it. Compared to a few generations ago, contemporary changes in names are relatively few and those that are accepted are the result, in large measure,

of modern research and the light it sheds on the application of the principle of priority. Invalid names, used in the past, are referred to as synonyms. Where they would be useful, these have been added at the end of the specific descriptions.

Some mention should be made of common or vernacular names. These, unfortunately, are often given with little reason and consistency. Since no rules are followed, the result is frequently confusing; a fancied resemblance is often sufficient reason to give the same name to two or more unrelated species. One finds, for example, the name "clover" used for a genus of the Figwort Family as well as for several species in several different genera of the Pea Family. Nevertheless, many people interested in flowers find it easier to remember common rather than scientific names, therefore, a single common name has been supplied for each species.

The use of common names varies greatly from region to region, therefore the selection of one for each species must of necessity be somewhat arbitrary. A further debt we owe to Dr. Hitchcock is that in the *Flora* he has supplied common names for each of the species he includes in the work. Some of the common names used in this handbook have been derived from other sources, but in general the author is grateful for being able to draw on Dr. Hitchcock's selection.

This handbook is not the result of monographic study but rather is an attempt to present modern thinking on the limits of species. The author has drawn freely on published research papers and standard floras, to all the authors of these, grateful acknowledgment is made. References are noted in detail where pertinent. Finally, the author wishes to express his thanks to Dr. A. F. Szczawinski, Curator of Botany, for his unfailing support and to the Curator of the University of British Columbia Herbarium for co-operation in the loan of specimens.

SCROPHULARIACEÆ Figwort Family

Herbs, often semiparasites, shrubs, rarely trees. Leaves without stipules. Inflorescences various. Flowers perfect, zygomorphic, basically 5-merous (except the gynoecium). Calyx 5- or sometimes 4-lobed, persistent. Corolla gamopetalous, variable from regular and 5-lobed to strongly 2-lipped. Stamens epipetalous, rarely 5, commonly 4 through the upper being absent or represented by a staminode, rarely 2. Ovary superior, 2-celled usually with numerous ovules; style terminal, simple or bifid; stigma entire, 2-lobed or 2-parted. Fruit a capsule (with us).

A large cosmopolitan family of about 200 genera and 2,500 species.

KEY TO THE GENERA

1. Leaves all, or chiefly, basal, the cauline either lacking or bractlike ..... *Limosella*
1. Leaves all, or principally, cauline (a basal rosette or basal shoots may be present).
   2. Anther-bearing stamens 5; corolla rotate; leaves alternate ..*Verbascum*
   2. Anther-bearing stamens 4 or 2; leaves opposite or alternate.
      3. Corolla spurred at base, the spur protruding through the 2 lower calyx lobes.
         Flowers in terminal racemes ..... *Linaria*
         Flowers solitary in axil of leaves ..... *Chænorrhinum*
      3. Corollas not spurred at the base.
         4. Corolla gibbous, blue ..... *Collinsia*
         4. Corolla not gibbous.
            5. Sterile or rudimentary stamen present.
               6. Sterile stamen rudimentary, merely a gland or scale; corolla short.
                  Low annuals; corrolas blue ..... *Collinsia*
                  Tall perennials; corollas brown or yellow ..... *Scrophularia*
               6. Sterile stamen filiform or spatulate; corolla long ..... *Penstemon*
            5. No sterile or rudimentary fifth stamen present.
               7. Anther-bearing stamens 2, sterile stamens 2.
                  Calyx 5-lobed; sterile stamens minute or even lacking ..... *Gratiola*
                  Calyx 4-lobed; sterile stamens represented by a pair of nobs at the corolla throat ..... *Lindernia*

7. Stamens 2 or 4, all fertile.
   8. Stamens 2.
      Calyx 5-parted ..... *Gratiola*
      Calyx 4-parted ..... *Veronica*
   8. Stamens 4.
      9. Stamens not enclosed by the broad upper lip of the corolla.
         Leaves opposite; corolla clearly 2-lipped, yellow or red ..... *Mimulus*
         Leaves alternate; corolla long, tubular, not markedly 2-lipped, white suffused with red ..... *Digitalis*
      9. Stamens enclosed in the hooded or folded lip (galea).
         10. Anther cells dissimilar, the inner pendulous by its apex; leaves alternate.
            Galea long, the lower lip small ..... *Castilleja*
            Galea not much longer than the saccate lower lip ..... *Orthocarpus*
         10. Anther cells similar and parallel; leaves mostly opposite.
            11. Capsule 2–4 seeded ..... *Melampyrum*
            11. Capsule many-seeded.
               12. Capsule inflated; seeds winged ..... *Rhinanthus*
               12. Capsule not inflated; seeds wingless.
                  13. Low plants, 1 dm or less in height; flowers 5–7 mm long ..... *Euphrasia*
                  13. Plants taller, 3 dm or more in height; flowers larger, beaked or hooded.
                     Leaves alternate; anther cells not mucronate ..... *Pedicularis*
                     Leaves opposite; anther cells mucronate ..... *Parentucellia*

CASTILLEJA Mutis Indian Paintbrush

Erect perennial or annual herbs. Leaves alternate, entire or dissected. Racemes spike-like with yellow, purple, or red bracts. Calyx of 2 lobes or seemingly of 4 lobes through the division of each of the larger lobes into 2 smaller ones. Corolla elongate, narrow, greenish, 2-lipped, the upper lip forming a beak-like galea (its petals being united at the tip) that includes the anthers, the lower lip shorter and often rudimentary. Stamens 4, didynamous. Capsule turgid, ovoid or cylindric-ovoid, glabrous. Seeds many, wingless.

A genus of more than 200 species, all limited to the New World, except for one that extends into northern Asia.

PENNELL, F. W. *Castilleja* in Alaska and Northwestern Canada. Proc. Acad. Nat. Sci., Philadelphia **86**:517–540. 1930.
OWENBY, MARION, in Vascular Plants of the Pacific Northwest. Part 4. Univ. of Washington Press. Seattle. 1959.

1. Annual; stems usually solitary; leaves and bracts entire, linear-lanceolate, the latter much longer than the flowers, only the upper third of the uppermost coloured red ..... *C. excilis*
1. Perennial; usually woody; stems clustered, often decumbent and sometimes rooting at the base; bracts 3- to 9-lobed or -divided or, if entire, much broader.
   2. Galea short, rarely over half the length of the corolla tube; lower lip prominent, usually more than one-third length of the galea (somewhat reduced and as little as one-fifth galea length in *C. cervina, C. levisecta,* and *C. lutescens*); bracts usually yellow or yellowish, rarely purplish or reddish (except in *C. raupii*).
      3. Lower lip prominent, usually half or more the length of the galea (as little as one-third in *C. cusickii*).
         4. Bracts violet-purple, oval, with 1 pair of short, linear, lateral lobes; leaves entire even on the upper stem; margins of galea violet purple; extreme northern species. ..... *C. raupii*
         4. Bracts yellowish, otherwise than above as to shape and lobing; at least some of the leaves with 1–3 pairs of spreading lobes; margins of galea pale yellowish; southern species. Calyx lobes acute, or if obtuse or obtusish, the plants rather harshly puberulent or pubescent or growing in dry habitats ..... *C. thompsonii*

Calyx lobes obtuse, or if acute, the plants rather softly pubescent and growing in meadows or moist situations ..... *C. cusickii*

3. Lower lip somewhat reduced, less than half, and sometimes as little as one-fifth, the galea length, more or less thickened and green proximately.

5. Calyx lobes acute; Interior species.
Bracts and herbage glabrous or with only minute, crisped puberulence ..... *C. cervina*
Pubescence harsh, leaves rough to touch ..... *C. lutescens*

5. Calyx lobes obtuse; flowers mostly hidden by the bracts; west of Cascade Mountains ..... *C. levisecta*

2. Galea longer and more slender, at times equalling or exceeding the corolla tube length; lower lip reduced, dark green and thickened, in most species one-fifth galea length or less (more prominent and as much as one-third galea length in *C. occidentalis, C. parviflora, C. rhexifolia,* and *C. sulphurea*); bracts showy, red or purple, but yellowish or whitish in *C. gracillima, C. occidentalis, C. sulphurea, C. unalaschensis,* and a variety of *C. parviflora.*

6. Leaves ordinarily all entire (rarely the uppermost somewhat lobed); bracts entire or lobed but rarely deeply divided; calyx subequally cleft above and below, or sometimes more deeply cut below.

7. Bracts predominantly yellow or yellowish (but varying to red or purple in two of the species).

8. Stems clumped, rather stout, erect or ascending from a woody base.

9. Upper leaves long-acuminate, caudate-falcate; extreme northwestern British Columbia ..... *C. unalaschensis*

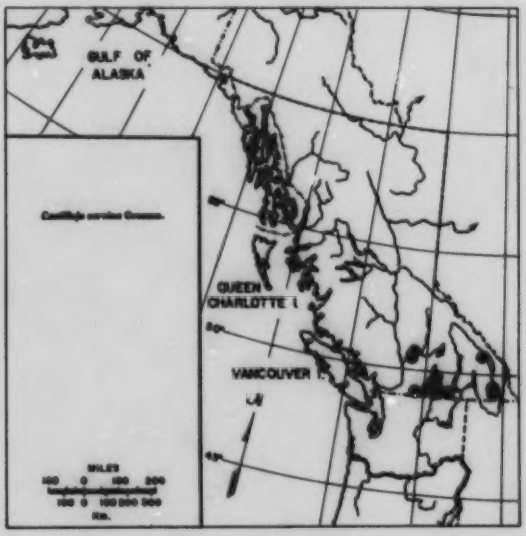
9. Upper leaves neither acuminate nor caudate; species of the Rocky Mountains and southeastern British Columbia.
Plants 1–2 dm tall, unbranched, strongly viscid-villous, at least in the inflorescence; alpine— ..... *C. occidentalis*
Plants mostly 2–5 dm tall, often branched, glabrous to viscid-villous but not strongly so; moist slopes and meadows below the alpine zone ..... *C. sulphurea*

8. Stems mostly solitary, although several may be attached to a remote caudex, slender, decumbent, or creeping and often rooting at the base; wet meadows, middle altitudes ..... *C. gracillima*

7. Bracts predominately red or purple, rarely yellow.
   10. Stems mostly 1–3 dm tall, usually unbranched; bracts crimson (drying purple) rarely scarlet; flowers mostly 20–30 mm long; alpine and subalpine zones.
      Plants strongly viscid-villous, at least in the inflorescence; bracts mostly entire; Cascade Mountains—*C. elmeri*
      Plants glabrate or only obscurely viscid-villous in the inflorescence; bracts commonly lobed; widespread—*C. rhexifolia*
   10. Stems mostly more than 3 dm tall, often branched; bracts scarlet, rarely crimson; flowers mostly 30–40 mm long; plants of lower elevations—*C. miniata*
6. Upper leaves and bracts ordinarily deeply cleft into 3–7 linear, spreading lobes (rarely all entire); calyx subequally cleft above and below or more deeply so above.
   11. Plants hispid with long multicellular hairs; midblade of leaves lanceolate to ovate-lanceolate, lateral lobes narrower—*C. hispida*
   11. Plants more villous than hispid, the hairs slender and entangled, sparse, sometimes glabrate (a variety of *C. hispida* may be found here).
      Leaves and bracts mostly 5-(7-)parted; midblade narrow, usually not much wider than the lateral lobes—*C. rupicola*
      Leaves and bracts mostly 3-(5-)parted; midblade broad, usually much wider than the lateral lobes—*C. parviflora*

1. ***Castilleja cervina*** **Greenm.**—Perennial. Stems clustered, erect, usually branched above, up to 6 dm tall, crisp-puberulent or glabrous, sometimes purplish. Leaves crisp-puberulent (rarely glabrous); the lower, linear, entire; upper usually with a pair of linear, divaricate lobes. Bracts broader than the leaves, 3- to 5-parted, crisp-puberulent, yellowish. Flowers rather remote and not concealed by the bracts; calyx 15–20 mm long, more deeply cleft below than above, its primary lobes again divided into 2 slender, acute segments about 2 mm long. Corolla slightly longer than, and usually exserted from, the calyx, not strongly curved, its lower lip reduced, one-half to one-quarter the length of the galea, with puberulent lobes.

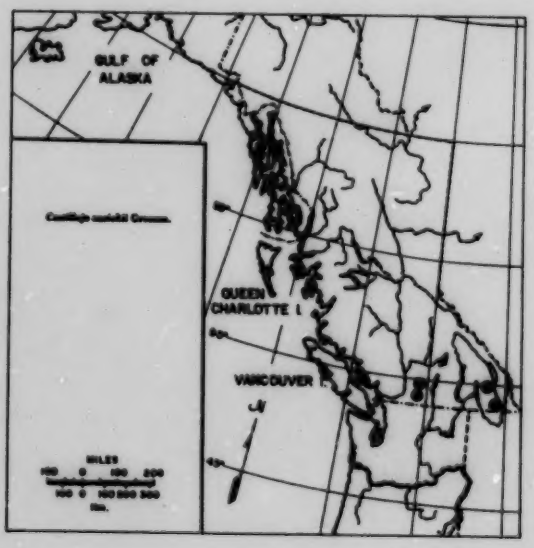
Grasslands and open coniferous woods; southern British Columbia to adjacent northern Idaho and northern Washington. Valleys of the dry Interior.

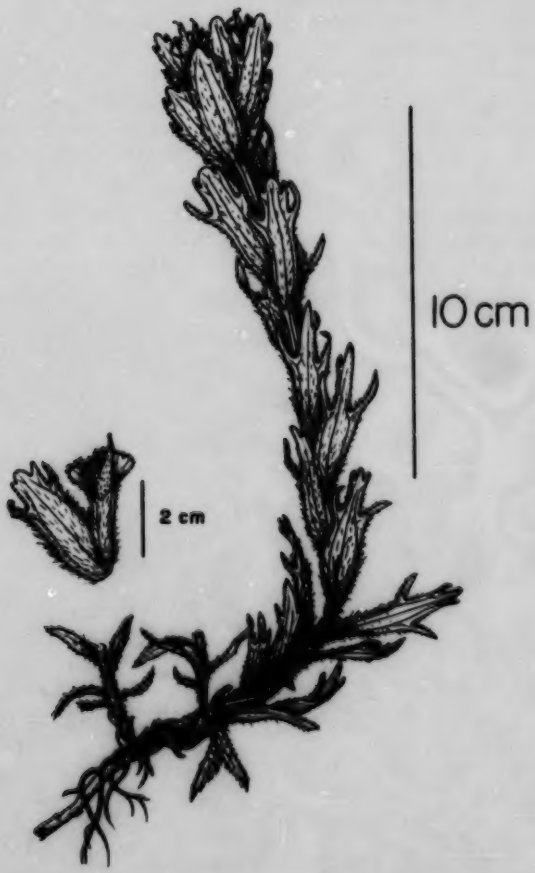


Deer paintbrush (*Castilleja cervina*).

2. *Castilleja cusickii* Greenm.—Perennial. Stems several or many in a clump, up to 5 dm tall, simple, hirsute-pubescent. Leaves numerous, lanceolate-attenuate with 1–3 pairs of spreading lobes. Bracts yellowish or yellow, distally rounded and less lobed than the leaves. Inflorescence strict, later elongating, flowers mostly hidden by the overlapping bracts. Calyx as much as 30 mm long, deeply and subequalling cleft above and below, lateral lobes rounded. Corolla from slightly shorter to slightly longer than the calyx, lower lip prominent, from one-third to nearly as long as the galea, galea densely glandular-puberulent.

Meadows; northern Wyoming, western Montana, southern British Columbia, southeastern Washington, and southeastern Oregon. Known only from the Nicola and Columbia Valleys.

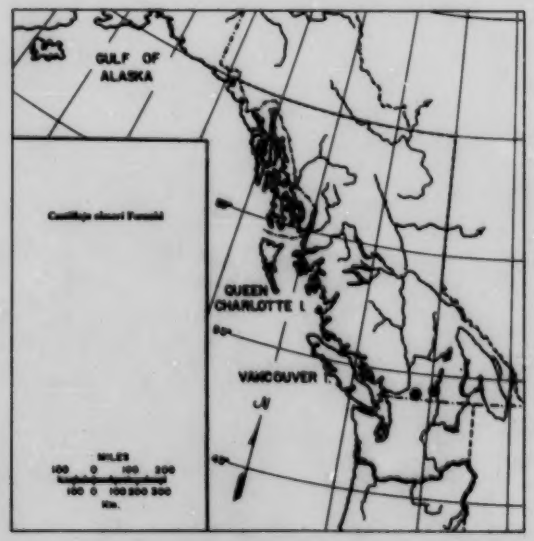


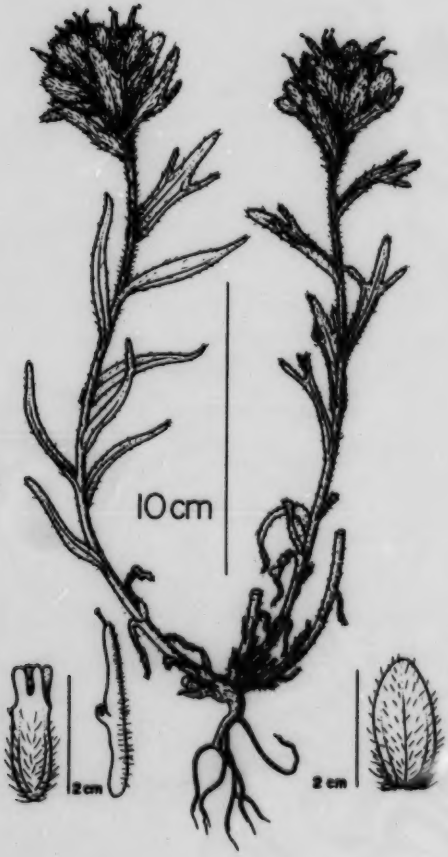


Cusick's paintbrush (*Castilleja cusickii*).

3. ***Castilleja elmeri*** **Fern.** — Perennial. Herbage finely glandular-pubescent, more so in the inflorescence. Stem ascending from a decumbent, woody base, up to 2 dm tall. Leaves linear-lanceolate, usually entire, sometimes with a pair of lateral lobes. Inflorescence conspicuous. Bracts broadly rounded, crimson, sometimes yellowish, at the tip, occasionally with 2 short lateral lobes. Calyx 16 mm or more long, purplish at the tip; medianly cleft for about half its length, each lobe again divided into 2 short, obtuse segments 1–4 mm long. Corolla 20–30 mm long, exceeding the bracts at anthesis; galea about half the length of the corolla, dorsally puberulent; lower lip about 2 mm long, green, somewhat protuberant.

Mountain slopes and meadows at fairly high altitudes in the Cascades; southern British Columbia to Washington. Known with us from Penticton and Manning Park.

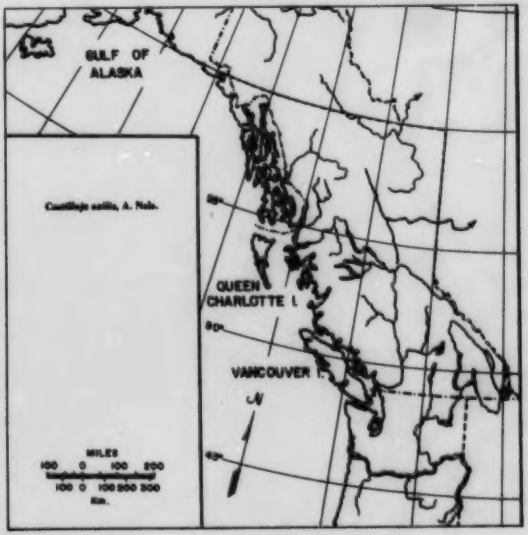


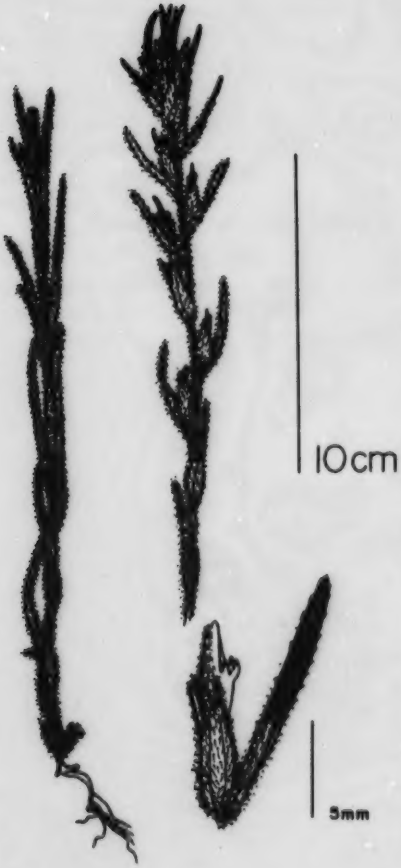


Elmer's paintbrush (*Castilleja elmeri*).

4. ***Castilleja excilis*** **A. Nels.**—Annual. Herbage glandular-villous to glandular-puberulent. Stems simple, sometimes branched, up to 8 dm tall. Leaves lanceolate-attenuate, entire. Inflorescence becoming elongate. Bracts leaf-like, the upper erect, scarlet in their upper third (although usually turning green by anthesis). Calyx green, about 18 mm long, cleft medianly for about two-thirds its length, lateral lobes lance-attenuate, 1.5–3.0 mm long. Corolla up to 25 mm long, usually not much longer than the calyx; galea about half as long as the corolla, dull yellow, dorsally pubescent, scarious margins wide, purplish or reddish; lower lip 2–3 mm long, yellowish with whitish lobes.

Moist, grassy places (often saline); southeastern British Columbia to eastern Montana, south to south central Oregon, northwestern New Mexico, northern Arizona, and adjacent California. In British Columbia known from a single collection on Mount Sabine.

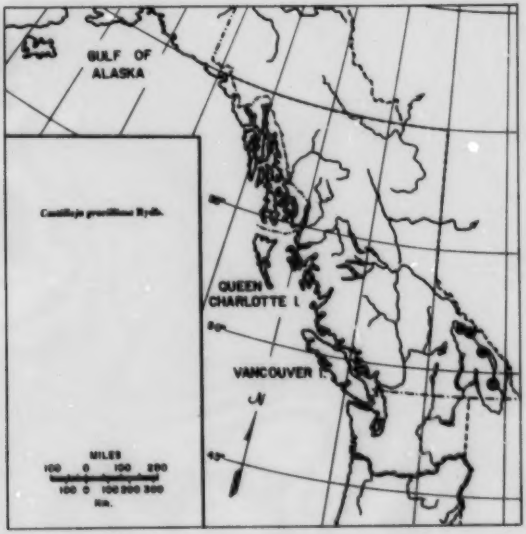


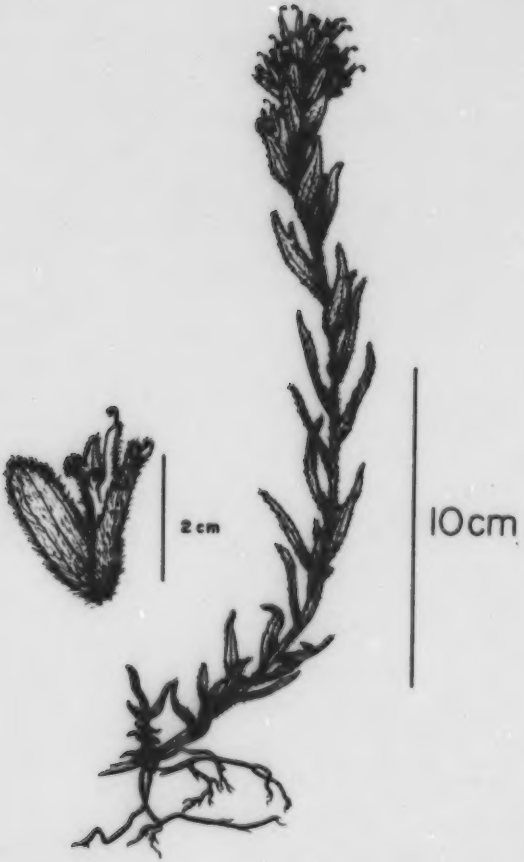


Annual paintbrush (*Castilleja exilis*).

5. *Castilleja gracillima* Rydb.—Perennial. Stems slender, erect or ascending, up to 5 dm tall, from a remote woody caudex, more or less creeping and often rooting at the base, usually unbranched, villous to glabrate. Leaves linear-lanceolate, all entire as a rule, villous-puberulent to glabrate. Inflorescence conspicuous, rather narrow, elongating in fruit, usually yellow but varying to orange or red; bracts oblong, entire, rounded or sometimes with a pair of lateral lobes, villous-puberulent. Calyx 15–22 mm long, deeply and subequally cleft above and below, primary lobes again divided into 2 acute segments about 3 mm long. Corolla 20–30 mm long, galea densely puberulent, about 5 times the length of the dark-green, thickened lower lip.

Wet meadows, northwestern Wyoming and adjacent Montana to central Idaho and eastern British Columbia. Rare in the Columbia Valley.

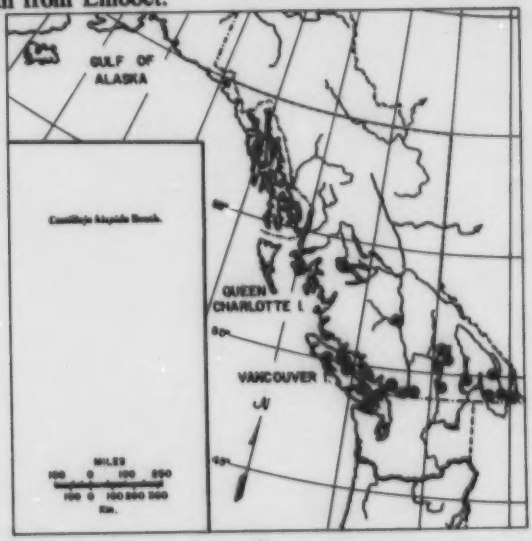


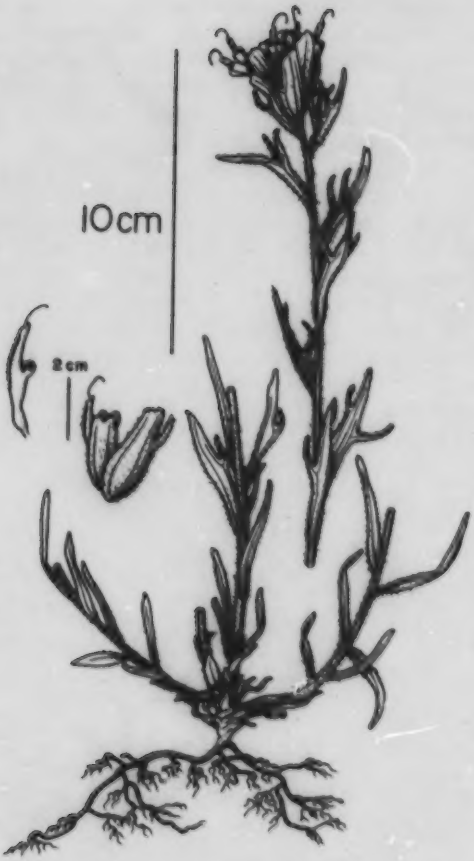


Slender paintbrush (*Castilleja gracillima*).

6. *Castilleja hispida* Benth. — Perennial. Stems clustered, erect or ascending from a woody base, up to 6 dm tall, usually unbranched, finely villous to more or less hispid. Leaves lanceolate or broader, finely villous or sometimes somewhat viscid to hispid-villous; the lower entire, reduced; the upper with usually 1–2 pairs of lateral lobes, narrower than the mid-blade, occasionally all leaves entire. Inflorescence showy, bright red or scarlet, occasionally yellow, short and broad at first, later elongating; bracts broad, rather deeply 3- to 5-lobed, more or less puberulent and villous. Calyx 15–30 mm long, deeply and subequally cleft above and below, primary lobes again divided 1–7 mm into 2 rounded segments. Corolla 20–40 mm long, galea puberulent to pubescent, about equal to tube in length and 5 times or more, longer than the dark-green, thickened lower lip.

Grassy slopes and forest openings at medium and low elevations; southwestern Alberta and northwestern Montana to southern British Columbia, south to Oregon and Idaho. Across the Province south from Lillooet.

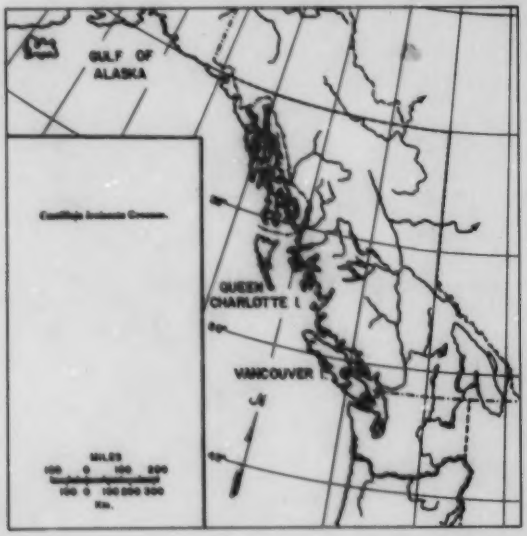


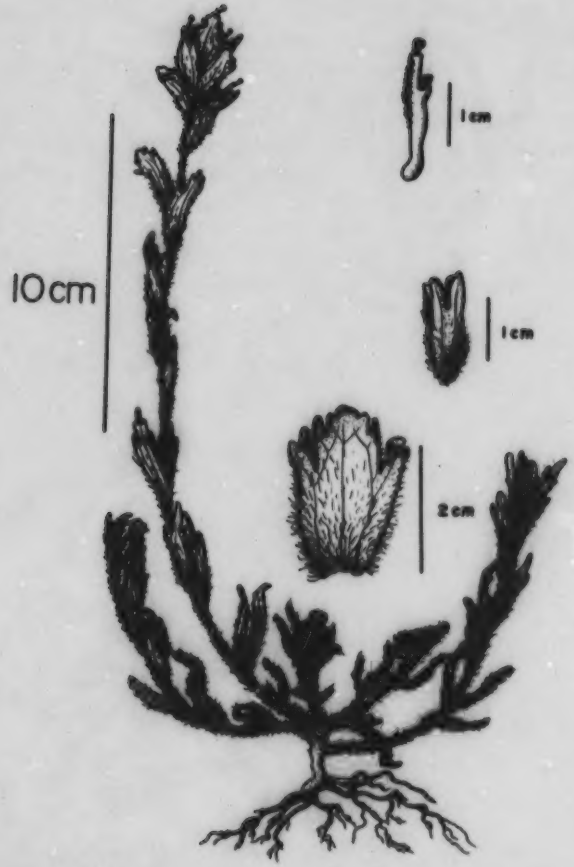


Harsh paintbrush (*Castilleja hispida*).

7. ***Castilleja levisecta Greenm.***—Perennial. Stems several, more or less decumbent or creeping at the base, usually unbranched, up to 5 dm tall, softly viscid-villous. Leaves viscid-villous to hispidulous; the lower linear-lanceolate, entire; the upper oblong-ovate or -obovate, usually with 1–3 pairs of short lateral lobes from the upper third of the blade; bracts about the width of the upper leaves, oblong, obtuse, entire or more usually with 1–3 short lateral lobes from near the apex, puberulent and more or less viscid-villous, golden yellow. Inflorescence narrow, elongating later. Flowers separated, mostly hidden by the overlapping bracts. Calyx about 17 mm long, deeply and subequally cleft above and below, primary lobes again rather deeply divided into 2 linear, obtuse segments. Corolla longer; galea rather slender, puberulent, about 3–4 times the length of the lower lip.

Meadows at low elevations west of the Cascades; Vancouver Island to central Oregon. Southeastern Vancouver Island only.

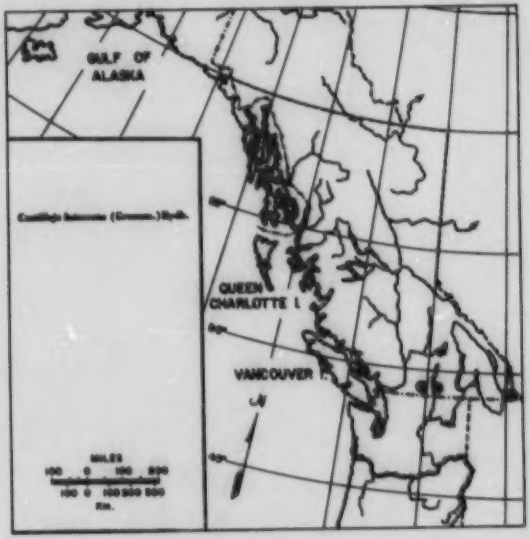




Golden Indian paintbrush (*Castilleja levisecta*).

8. ***Castilleja lutescens*** **(Greenm.) Rydb.**—Perennial. Stems clustered, usually erect, stout, often branched above, up to 6 dm tall, puberulent to obscurely villous or hispid, sometimes purplish. Leaves linear or linear-lanceolate, scabrous-puberulent, mostly entire, but the upper ones with 1 (rarely 2) pairs of short lateral lobes. Bracts yellowish, densely puberulent, broader than the leaves, obtuse, entire or more commonly 3– to 7-lobed, the lobes usually short. Calyx 15–25 mm long, deeply and subequally cleft above and below, primary lobes again divided into 2, triangular or linear, acute lobes 1–7 mm long. Galea usually exserted 1–10 mm beyond the calyx, 2–5 times the length of the lower lip, lobes commonly puberulent.

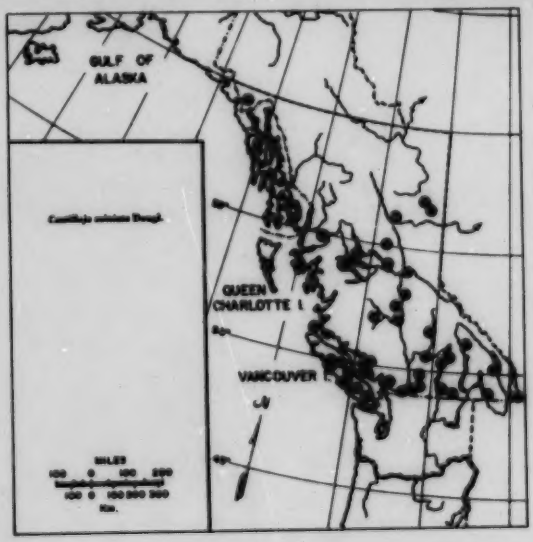
Grasslands and open coniferous woods; southwestern Alberta and southern British Columbia to northeastern Oregon and northwestern Montana. Known in British Columbia only from the dry Interior.



Yellowish paintbrush (*Castilleja lutescens*).

9. *Castilleja miniata* Dougl.—Perennial. Stems few, erect or ascending from a woody base, up to 8 dm tall, frequently branched, glabrous to short-pubescent or somewhat viscid-villous. Leaves linear or lanceolate, sometimes broader, usually entire but sometimes with a few lobes, glabrous to puberulent or finely villous with simple hairs. Inflorescence conspicuous, bright red or scarlet, occasionally crimson or rarely yellow, at first short and broad but frequently elongating in fruit; bracts oblong-ovate, more or less toothed or cleft, with acute segments, rarely entire, puberulent and villous, often viscid. Calyx 15–30 mm long, deeply and subequally cleft above and below, primary lobes again divided into 2, usually linear, segments 3–9 mm long. Corolla 20–40 mm long, galea puberulent to pubescent, three-quarters to about as long as the tube, 5 or more times as long as the dark-green, thickened lower lip (including *C. hyetophila* Pennell and *C. fulva* Pennell).

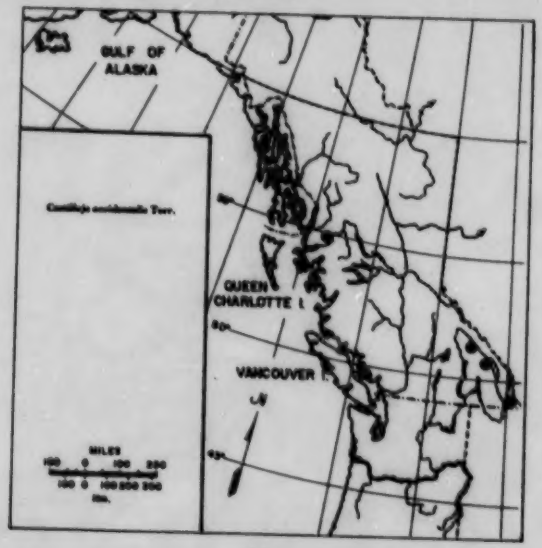
Open areas, mostly at relatively low elevations; Alaska to California, Arizona, and New Mexico. Common throughout the Province.



Scarlet Indian paintbrush (*Castilleja miniata*).

10. ***Castilleja occidentalis*** **Torr.** — Perennial. Stems clustered, erect or ascending from a woody base, not more than 2 dm tall, unbranched, mostly purplish, more or less viscid-villous. Leaves linear-lanceolate (rarely broader), usually all entire, but the upper sometimes with a pair of lateral lobes, viscid-villous or viscid-puberulent. Inflorescence short and compact, predominantly yellow but varying to red and purple; bracts ovate-oblong, entire and rounded or with 1–2 pairs of lateral lobes, strongly viscid-villous. Calyx 15–20 mm long, deeply and subequally cleft above and below, primary lobes again divided into 2 mostly blunt segments 1–4 mm long. Corolla 18–25 mm long, galea minutely puberulent, much shorter than the tube and 3–4 times the length of the rather prominent lower lip.

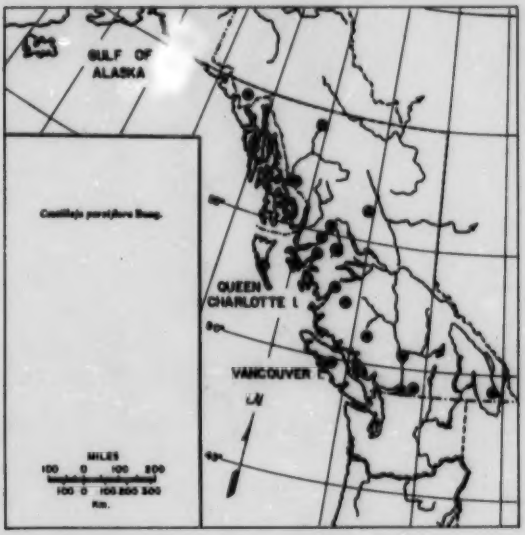
Alpine slopes and meadows; in Rocky Mountains from southeastern British Columbia and southwestern Alberta and northwestern Montana, south to Colorado and Utah. Known with us in the mountains south from Glacier.



Western paintbrush (*Castilleja occidentalis*).

11. *Castilleja parviflora* Bong.—Perennial, strongly blackening in drying. Stems clustered, erect or ascending from a woody base, usually not more than 3 dm tall, glabrate to obscurely villous, not at all hispid. Leaves glabrate to somewhat villous, all, except sometimes the lowermost, divided into 3–5 divergent lobes, the lateral segments much narrower than the mid-blade. Inflorescence conspicuous, white to pinkish (in our variety), at first short and compact, later elongating; bracts villous, 3- to 5-parted, about as long as the flowers. Calyx 12–20 mm long, deeply and subequally cleft above and below, primary lobes again divided into 2 usually acute (in our variety) segments up to 6 mm long, rarely undivided. Corolla (with us) 12–20 mm long; galea minutely puberulent, about as long as the tube and 3 times or more the length of the dark-green, thickened, lower lip.

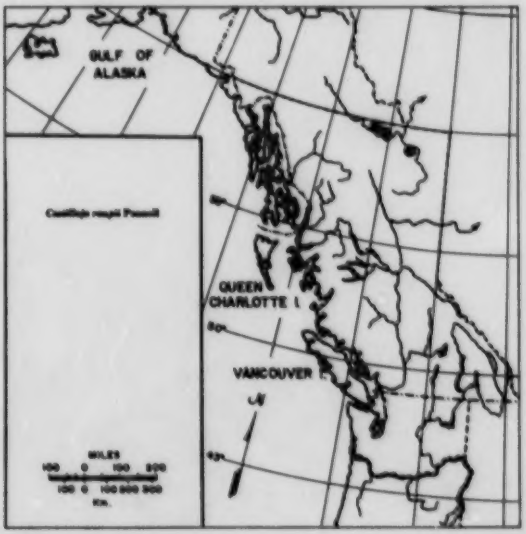
Subalpine meadows; Alaska to Oregon. Throughout the Province.

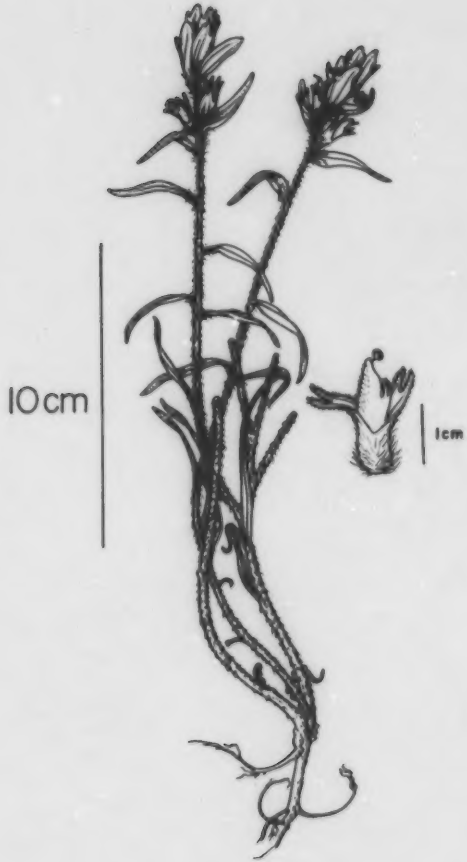


Small-flowered paintbrush (*Castilleja parviflora*).

12. ***Castilleja raupii*** **Pennell** — Perennial. Stems several, slender, up to 5 dm tall, finely retrorse-pubescent, greenish or purplish. Leaves entire, linear, attenuate or caudate, finely pubescent. Bracts oval, becoming lanceolate, with a pair of short linear, lateral lobes, finely pubescent or puberulent, violet-purple. Calyx about 15 mm long, violet-purple, hirsute towards the base, becoming finely pubescent or canescent towards the apex, cleft subequally for about half its length, primary lobes cleft again near the tip. Corolla slightly longer than the calyx; galea acute, hirsute, green with wide glabrous, violet-purple margins, about twice as long as the dark-violet-purple lower lip.

Moist soil along streams and lakes, also in swamps; Alaska to James Bay, south to northern British Columbia and Alberta. Has only been collected in extreme northern British Columbia.

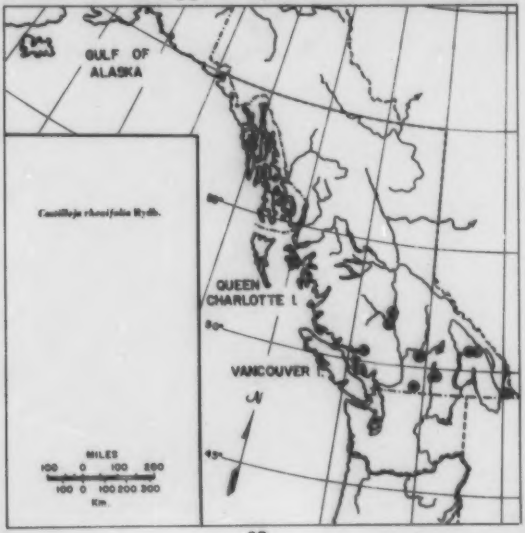




Raup's paintbrush (*Castilleja raupii*).

13. ***Castilleja rhexifolia Rydb.***—Perennial. Stems clustered, erect or ascending from a woody base, usually not more than 3 dm tall, mostly unbranched, glabrate, villous, or sometimes viscid-villous. Leaves linear-lanceolate or sometimes broader, ordinarily all entire, but the upper sometimes lobed, glabrous to puberulent, finely villous or viscid-villous. Inflorescence conspicuous, generally crimson(drying purple), but varying to scarlet and occasionally yellow, at first short and compact, later elongating in fruit; bracts oblong-ovate, entire and rounded or sometimes acute, commonly with 1–2 pairs of short lateral lobes, villous-puberulent. Calyx 15–25 mm long, subequaly cleft, primary lobes again divided into 2 usually blunt segments 3–6 mm long. Corolla 20–35 mm long; galea puberulent, usually much shorter than the tube, 4–5 times as long as the dark-green, thickened, lower lip.

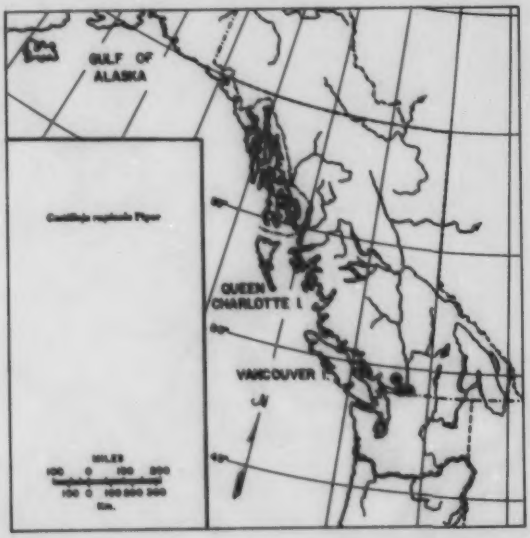
Alpine and subalpine meadows; Rocky Mountains from Alberta and southern British Columbia, south to Colorado and northern Utah, west through Idaho, to northeastern Oregon. Occurs south from about Lat. 52°N., apparently absent from Vancouver Island.

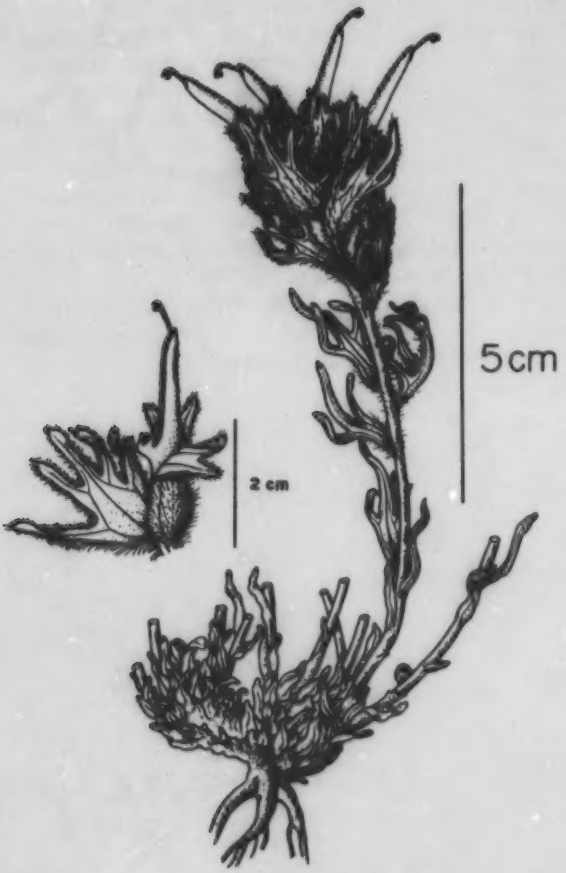


Alpine paintbrush (*Castilleja rhexifolia*).

14. *Castilleja rupicola* Piper—Perennial. Stems clustered, erect or ascending from a woody base, rarely more than 2 dm tall, unbranched, obscurely villous with crisped hairs, not at all hispid. Leaves finely villous, all divided into 3–5(7) divergent lobes, or the lowermost rarely entire, the lateral segments not much narrower than the mid-blade. Inflorescence conspicuous, bright scarlet or crimson, rather short and few-flowered; bracts puberulent and villous, mostly 5-parted, much shorter than the flowers at anthesis. Calyx 15–25 mm long, deeply subequally cleft above and below, primarly segments again divided into 2 obtuse or acute segments 1–5 mm long. Corolla 25–35(45) mm long; galea minutely puberulent, equal to or longer than the tube, many times as long as the thickened, dark-green, lower lip.

Cliffs and rocky places at mid to upper elevations; Cascade Mountains from southern British Columbia to central Oregon. Known only from the Skagit Valley in British Columbia.

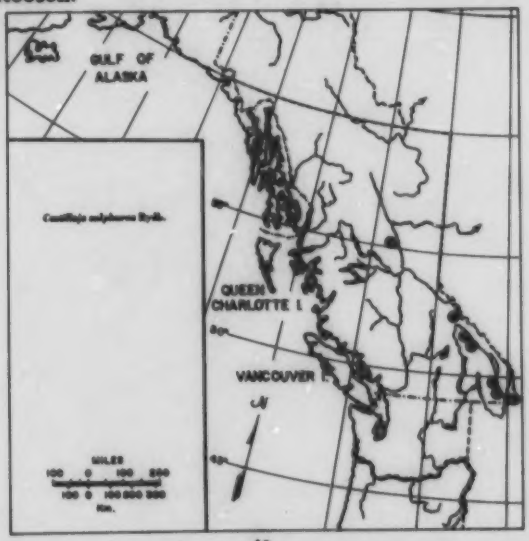




Cliff paintbrush (*Castilleja rupicola*).

15. ***Castilleja sulphurea*** **Rydb.** — Perennial. Stems clustered, erect or ascending from a woody base, up to 5 dm tall, frequently branched above, usually glabrous or glabrate below, commonly viscid-villous above, occasionally puberulent throughout. Leaves linear to lance-ovate, ordinarily all entire, but the upper sometimes lobed, glabrous to puberulent or finely villous. Inflorescence conspicuous, pale yellow, at first short and broad, often elongating in fruit; bracts oblong-ovate, generally entire and rounded, or sometimes acute or with 1–2 pairs of short lateral lobes, puberulent and villous. Calyx 15–25 mm long, deeply and subequally cleft above and below, the primary lobes again notched or cleft into 2 short segments. Corolla 18–30 mm long; galea shorter than the tube, minutely puberulent, 3–4 times the length of the dark-green, thickened, lower lip.

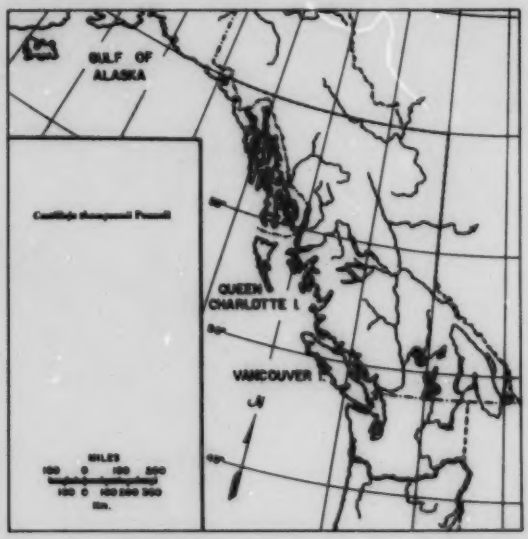
Moist meadows and slopes at medium to high altitudes; southern Alberta and eastern British Columbia, south to western Montana, Colorado, Utah, and New Mexico. In British Columbia known from the west side of the Rocky Mountains, south from Mount Robson.

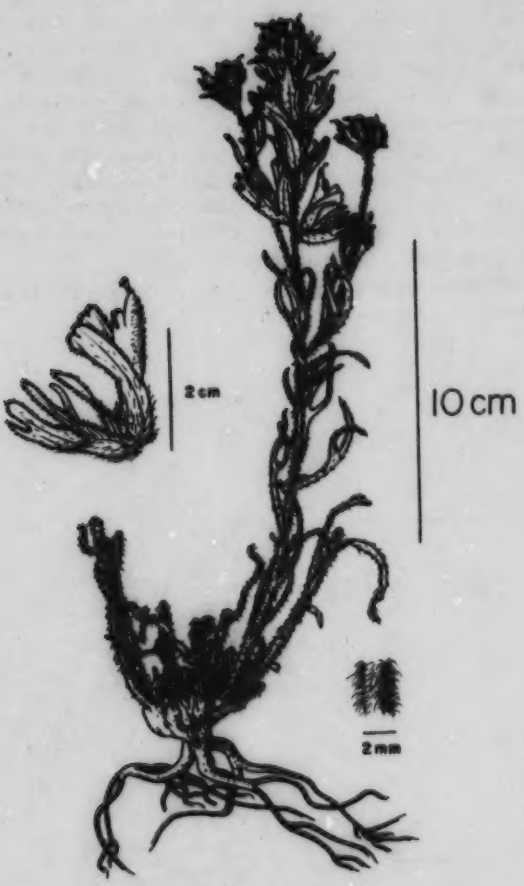


Sulphur paintbrush (*Castilleja sulphurea*).

16. *Castilleja thompsonii* Pennell—Perennial. Stem clustered, erect or ascending, often branched above, up to 4 dm tall, sometimes purplish, hispid or villous. Lower leaves linear, entire, upper with 1–2 pairs of linear, divergent lobes, hispid or villous, sometimes glandular. Inflorescence yellowish; bracts 3- to 5-parted, broader than the leaves, puberulent and ciliate. Calyx often purplish, 12–25 mm long, deeply and subequally cleft above and below, primary segments usually again divided into 2 short segments, sometimes only notched. Galea usually included in the calyx or slightly exserted, lower lip prominent, scarcely pouched, two-thirds to four-fifths the length of the galea.

Dry soils, often with sagebrush; southern British Columbia and Washington. Okanagan Valley only.

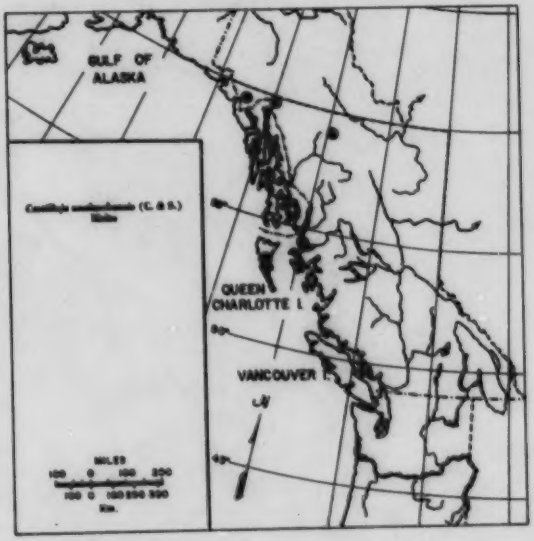




Thompson's paintbrush (*Castilleja thompsonii*).

17. *Castilleja unalaschensis* (C. & S.) Malte—Perennial. Stems stout, 3–6 dm tall, lanose-pubescent with semi-appressed hairs to glabrate or glabrous. Leaves lanceolate, entire or nearly so, roughish appressed-pubescent to glabrate. Inflorescence yellow to orange-yellow; bracts oval, entire or the upper with 1–2 pairs of very short obtuse lobes or teeth. Calyx about 20 mm long, cleft above and below for about half its length, primary lobes again divided. Corolla 15–30 mm long; galea less than 5 times the length of the green and incurved lower lip, its membranous margins yellowish.

Grassy places; south coastal Alaska from the Aleutian Islands east, inland to southwestern Yukon and northwestern British Columbia. Known with us only from Atlin and Haines Road.



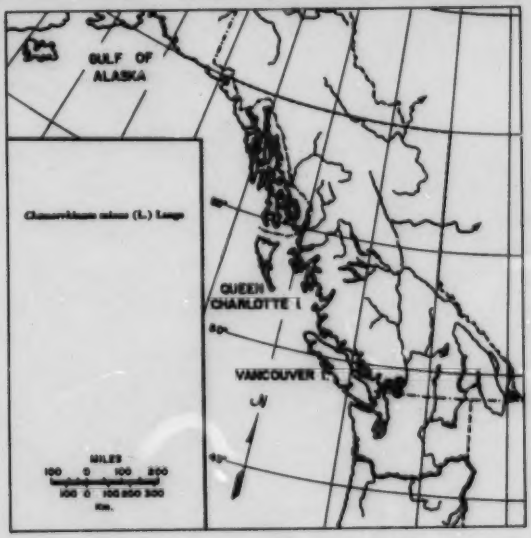
Alaska paintbrush (*Castilleja unalaschensis*).

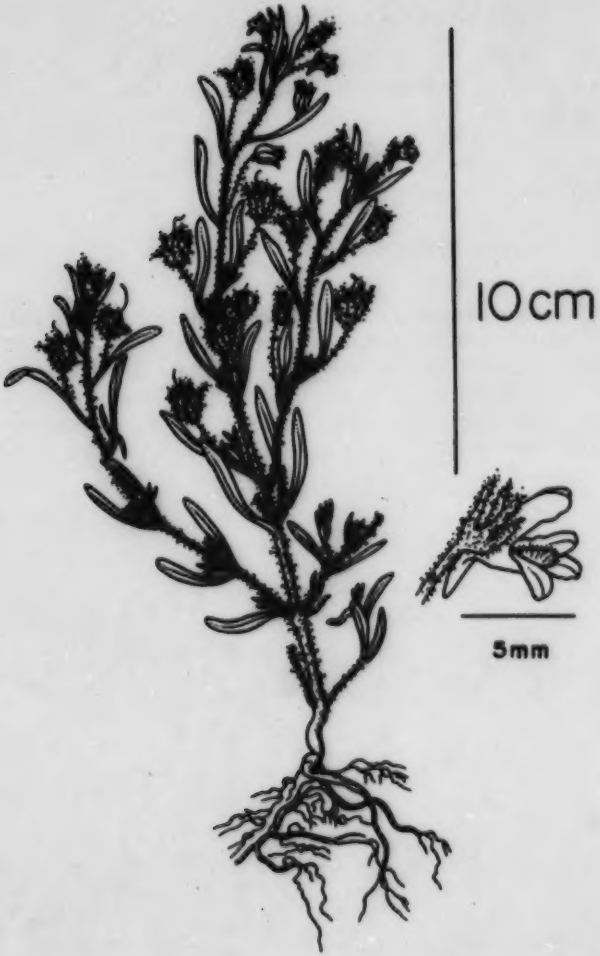
CHÆNORRHINUM Reich. Toadflax

Annual or perennial herbs. Stems branching. Leaves alternate narrow, entire. Flowers small, solitary in the axils of bracteal leaves, pedicellate. Calyx deeply 5-parted, corolla spurred at the base, strongly 2-lipped, the lobes of the upper lip nearly straight or arched over the palate, the lower lip with well-developed palate, throat not closed; stamens 4. Capsule subglobose, opening by 2 pores.

About 20 species, all except the following from the Mediterranean region.

***Chænorrhinum minus* (L.) Lange**—Annual. Stems erect, up to 25 cm tall, usually glandular-pubescent, branches ascending. Leaves, 10–25 mm long, alternate, linear-lancelate, too oblong, entire, obtuse, narrowed at the base, short petiolate. Flowers solitary in the axils of the somewhat reduced bracteal leaves; pedicels much longer than the flowers. Sepals more or less linear, obtuse, about





Dwarf snapdragon (*Chænorrhinum minus*).

3 mm long. Corolla about twice as long, blue-purple outside, paler within, palate yellow, spur about 2 mm long, obtuse. Capsule ovoid to subglobose, shorter than the calyx; seeds ovoid, longitudinally ridged (*Linaria minor* (L.) Desf.).

Wasteland, particularly road cuts and railway embankments; Eurasia; widely established in North America. Only locally established in British Columbia.

COLLINSIA Nutt. Blue-eyed Mary

Annual herbs. Stem erect. Leaves opposite, dentate to entire, the upper sessile or clasping. Flowers 1–several, axillary in the upper, sometimes reduced, leaves. Sepals 5, united one-sixth to one-half their lengths, lobes subequal. Corolla blue, gamopetalous, strongly 2-lipped, its tube flattened vertically, gibbous at the base on the upper side, the upper lip erected or ascending, the lower lip 3-lobed with the lateral lobes projecting horizontally. Stamens 4, somewhat didynamous, anther cells spreading. Fruit a capsule; seed 1–few, large, wingless.

A genus of about 20 species, mostly in western North America.

NEWSON, V. M. Review of the genus *Collinsia* (Scrophulariaceæ). Bot. Gaz. **87**:260–301. 1929.

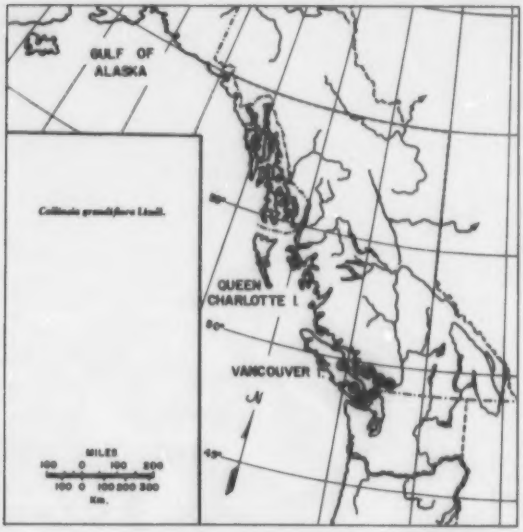
Corolla 4–6 mm long, white and blue to violet-blue; corolla tube gibbous at base, erect or slightly declined; corolla lips inconspicuously divergent, one-third the total corolla length, lobes narrowed and entire; calyx over half the length of the corolla, its lobes somewhat concealing the corolla tube ..... *C. parviflora*

Corolla over 6.5 mm long, violet; corolla tube deeply saccate at base, strongly declined to form right angle with the pedicel; corolla lips divergent one-half to one-third corolla length, its lobes not concealing the corolla tube ..... *C. grandiflora*

1. ***Collinsia grandiflora* Lindl.**—Stems erect, rarely somewhat decumbent, up to 40 cm tall, simple or branching, glabrate below, glandular-pubescent above. Leaves oblong to lanceolate, becoming linear in the upper whorls, sessile or occasionally slightly petiolate, glabrate, serrulate to entire or entire-revolute, scabrous-margined, 1–4 cm long, becoming bract-like in the inflorescence, lower leaves oblong to spatulate, obtuse, petioles 5–10 mm long.

Flowers 3–7 at a node, rarely solitary; pedicels puberulent, inconspicuously glandular. Calyx membranous below, glabrate-puberulent, scabrous-margined, 4–7 mm long, lobes subulate, acuminate, 2–5 mm long. Corolla 7–15 mm long, strongly declined forming a right angle with the pedicel, upper lip white to purple, lower lip deep blue-violet, lips reflexed about half corolla length. Capsule 4–5 mm long, exceeded only by calyx tips; seeds normally 4, thickened, round-oblong, smooth reddish-brown.

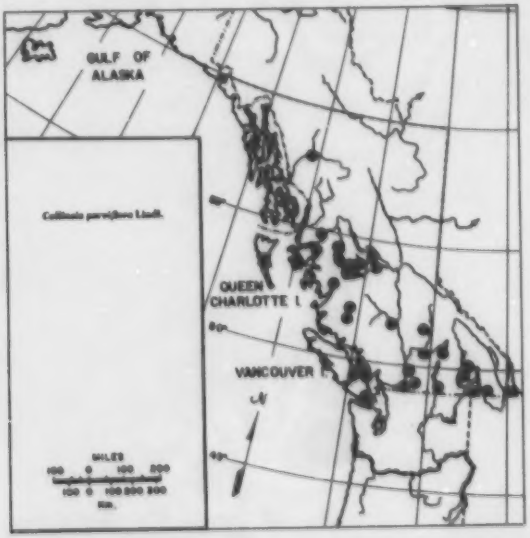
Grassy places, west of Cascade Mountains, southern British Columbia to California. In British Columbia along the Coast south from about Lat. 55°N.



Large-flowered blue-eyed Mary (*Collinsia grandiflora*).

2. *Collinsia parviflora* Lindl.—Stems erect or ascending, up to 50 cm tall, branched, glabrate to puberulent. Leaves serrulate to entire, oblong to lance-linear, becoming smaller and linear-bractlike in the inflorescence, glabrate-puberulent or sparsely glandular, often purplish below, lower leaves ovate to oblong-ovate, petioles up to 10 mm long. Flowers 2–5 in a whorl above, usually solitary below; pedicels puberulent to glandular-pubescent; calyx somewhat membranous below, puberulent to glabrate, scabrous-margined, from about half as long to equalling the corolla in length, lobes subulate to linear-lanceolate, acuminate-acute; corolla declined to almost erect, tube white to pale blue, lobes clear blue, often pale, upper lip varying to white, slightly recurved from crested region; capsule 3–4 mm long, slightly exceeded by calyx tips.

Open, grassy places, mossy rocks, and vernally wet slopes; Alaska to southern California, east to Ontario, Michigan, and Colorado. General throughout the southern half of the Province.



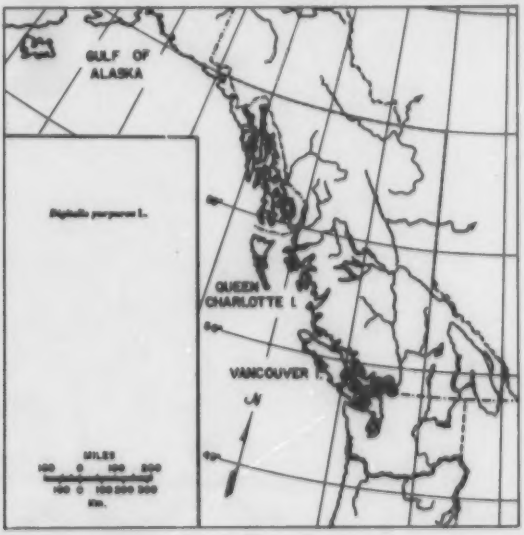
Small-flowered blue-eyed Mary (*Collinsia parviflora*).

DIGITALIS L. Foxglove

Biennial or perennial herbs. Stems tall. Leaves alternate, lowermost forming a rosette. Inflorescence a unilateral, bracteate raceme; flowers nodding. Calyx deeply 5-lobed. Corolla with a long, campanulate tube, contracted at the base, shortly 5-lobed the 3 lower lobes forming a longer and more prominent lower lip. Stamens 4.

About 20 species in Europe, particularly in the Mediterranean region, east to central Asia.

Digitalis purpurea **L.** — Biennial, rarely perennial. Stems erect, up to 1.5 m tall, simple, greyish tomentose or more glabrous below. Leaves 20–30 cm long, ovate to lanceolate, crenate, green and softly pubescent above, grey-tomentose beneath, attenuate to a winged petiole. Raceme many-flowered; bracts lanceolate, sessile, entire, decreasing in size upward; pedicels tomentose, longer than the calyx. Calyx foliaceous, sepals acute, up to 1.5 cm long,



Foxglove (*Digitalis purpurea*).

the lower ovate, the upper acute. Corolla 3–4 times as long as the calyx, pinkish-purple with deeper purple spots on the inside of the tube, shortly ciliate with a few long hairs within; stamens and filiform style included. Capsule ovoid, longer than the calyx.

Acid soil in open woods. Native of western Europe and Morocco; established from southern British Columbia to California, mostly west of the Cascades. Locally common in the Lower Mainland, Gulf Islands, and southern Vancouver Island.

EUPHRASIA L. Eyebright

Annual herbs (ours). Leaves rather small, opposite or the upper alternate. Inflorescence a leafy terminal spike, bracts differing somewhat from the stem-leaves. Calyx campanulate, 4-toothed. Corolla 2-lipped, the upper slightly concave with 2 lobes, the lower 3-lobed with emarginate lobes. Stamens 4, the anthers pointed at the base. Capsule oblong; seeds small, numerous, furrowed, oblong or cigar-shaped.

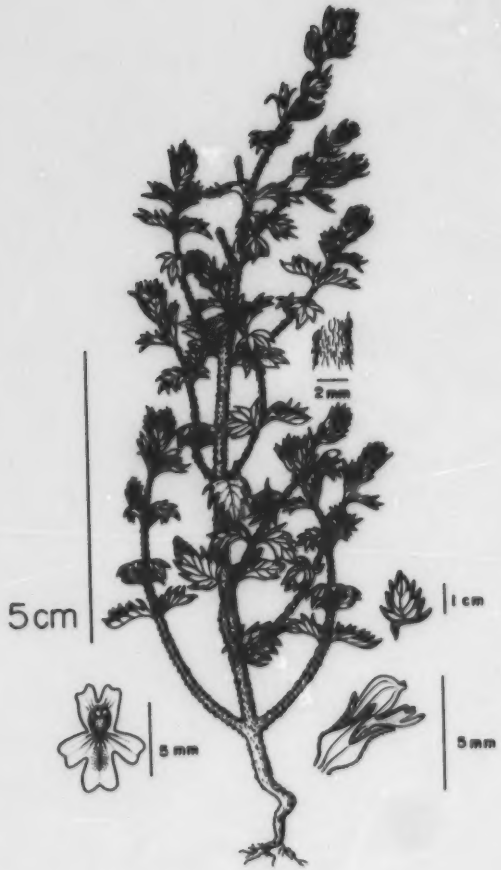
A genus of about 130 species of the North Temperate regions, temperate South America, Australia, and New Zealand.

Bracts of the inflorescence with obtusish to acute but not bristle-tipped teeth; capsule and calyx distinctly pubescent; leaves commonly more or less pubescent; corolla 5–8 mm long; lobes of lower lip nearly parallel ..... *E. arctica*

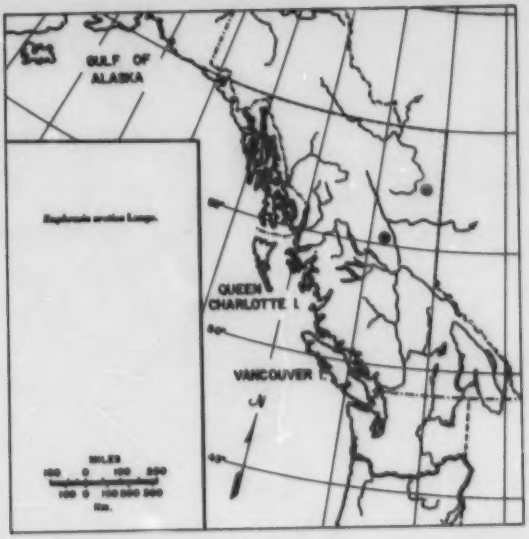
Bracts of the inflorescence with subulate or bristle-tipped teeth; capsule and calyx nearly or quite glabrous; leaves commonly glabrous; corolla 7–10 mm long; lobes of lower lip wide-spreading ..... *E. officinalis*

1. ***Euphrasia arctica*** **Lange**—Stems finely puberulent, up to 25 cm tall, frequently branched below. Leaves up to 18 mm long, ovate or orbicular, crenate with 7–11 teeth, bracts resembling the stem-leaves but with more pointed teeth. Corolla about 5 mm long, whitish with a yellow eye, only slightly, if at all, surpassing the calyx. Capsule more or less hairy (*E. subarctica* Raup).

Wet places, stream banks, and bogs; circumpolar, south in the United States to Maine, Michigan, Minnesota, and Montana. Rare, only known from northern half of British Columbia.



Northern eyebright (*Euphrasia arctica*).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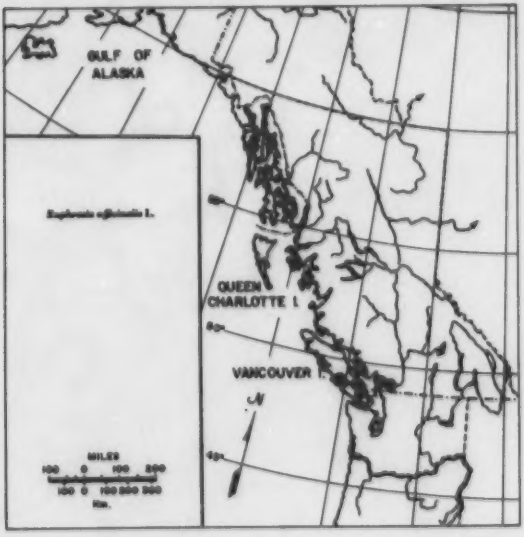
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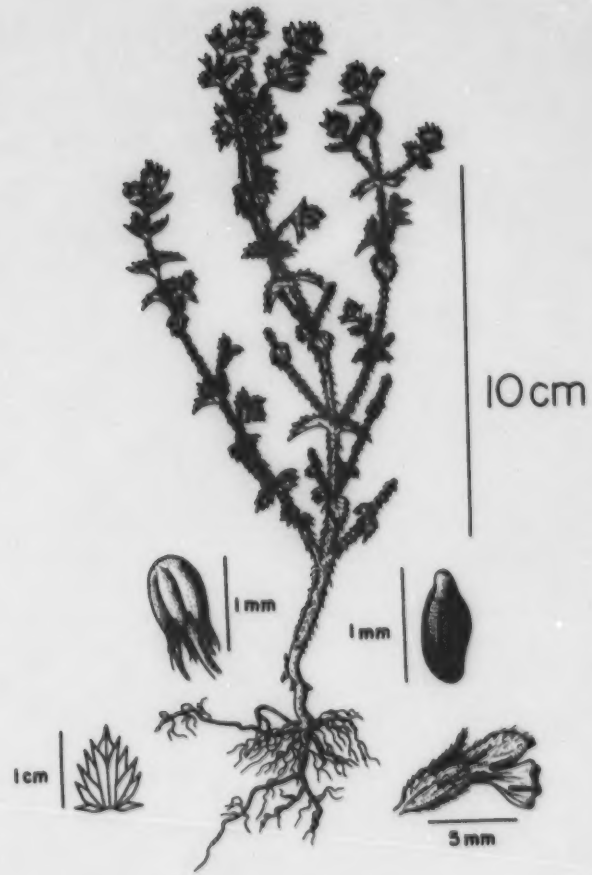


Hairy eyebright (*Euphrasia officinalis*).

2. *Euphrasia officinalis* L.—Stems up to 4 dm tall, simple or freely branched, bearing flowers in the upper one-half to two-thirds. Leaves ovate to suborbicular, sharply 3- to 5-toothed on each margin; bracteal leaves similar, glabrous to sometimes hairy beneath, the teeth subulate or bristle-tipped. Corolla 5–10 mm, the lower lip white with violet lines, the upper blue or purplish. Capsule nearly or quite glabrous (*E. americana* Wettst., *E. canadensis* Townsend).

Fields, roadsides, and waste places; Europe, but widely naturalized in eastern North America. Found with us occasionally in the Lower Mainland.

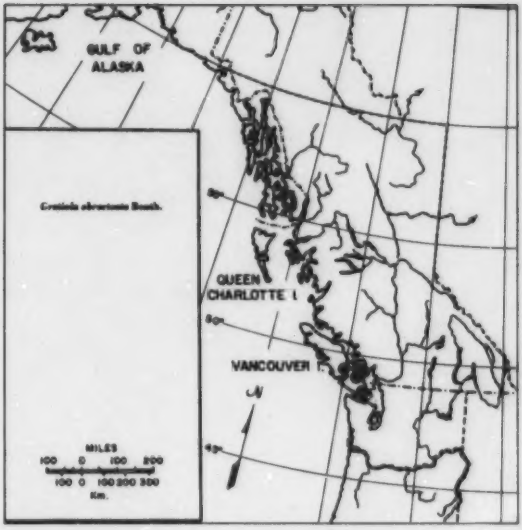
GRATIOLA L. Hedge-hyssop

Small annual or perennial herbs. Leaves opposite, sessile, entire or toothed. Flowers small, yellowish or whitish, solitary on axillary pedicels, usually subtended by a pair of sepal-like bractlets. Sepals 5, elongate, usually not equal in length. Corolla bilabiate, tubular, or narrowly campanulate, lobes of the upper lip united nearly to the summit, pubescent at the base within, lobes of the lower lip rounded. Stamens 2, inserted near the middle of the corolla-tube, included or barely exserted, connective of the anthers expanded and saucer-shaped, longer and wider than the transverse anthers. Capsule conic, ovoid or globose, many-seeded.

Twenty species in the Northern Hemisphere.

Pedicels with 2 bracteoles beneath the calyx; leaves and sepals obtuse or acutish; capsule ovoid; plants finely glandular-pubescent ..... *G. neglecta*

Pedicels without bracteoles; leaves and sepals attenuate; capsule nearly globose; plants glabrous ..... *G. ebracteata*



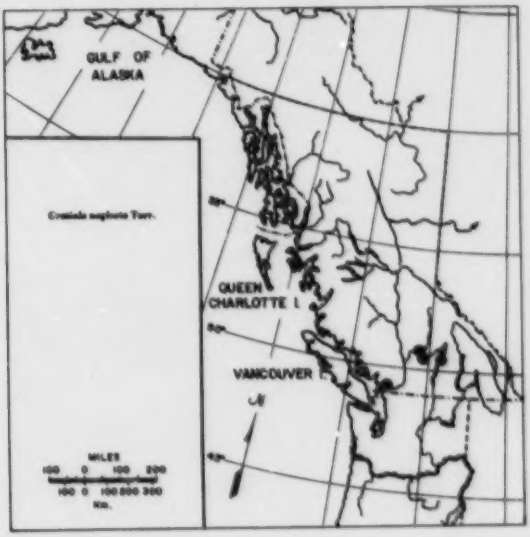
1. *Gratiola ebracteata* Benth.—Annual. Stems 0.5–1.5 dm tall, glabrous, simple or branched. Leaves lanceolate-attenuate, slightly clasping at the base, denticulate toward the tip. Pedicels 10–20 mm long, ascending, stout; bracteoles lacking. Sepals about 1 cm long, lance-attentuate. Corolla about 6 mm long, upper lobes united for less than half their length. Capsule more or less globose, 4–5 mm long.

Muddy and wet places generally; southern British Columbia to California, east to western Montana. Known from southern Vancouver Island and some Gulf Islands.

Bractless hedge-hyssop (*Gratiola ebracteata*).

2. *Gratiola neglecta* Torr.—Annual. Stem 1–3 dm tall, simple or branched, erect or diffuse, finely stipitate-glandular upward. Leaves oblong-lanceolate to nearly obovate, up to 4 cm long, entire or slightly denticulate upward, slightly clasping at the base. Pedicels 10–20 mm long, slender, spreading; bracteoles 2, as long as or longer than the lanceolate sepals. Corolla about 10 mm long, upper lobes joined nearly to the apex, tube white or yellowish with a small purple limb. Capsule broadly ovoid, pointed.

In shallow water and muddy places generally; southern British Columbia to Quebec, south to California, Arizona, Texas, and Georgia. Southern British Columbia from the Okanagan Valley to the Lower Mainland.



Common American hedge-hyssop (*Gratiola neglecta*).

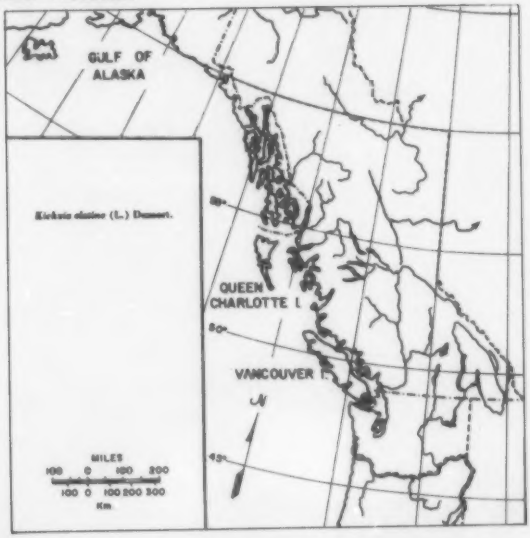
KICKXIA Dumort. Fluellin

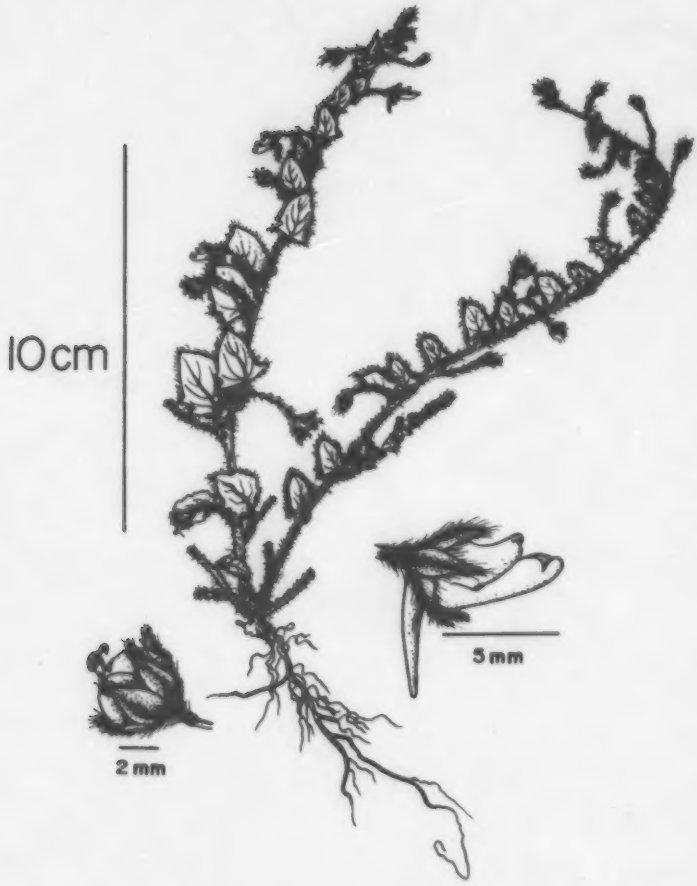
Annual herbs. Stems slender, diffuse, spreading. Leaves alternate except toward the base, short-petioled, pinnately veined. Flowers axillary, scattered, bracts like the leaves, only smaller. Calyx 5-parted. Corolla with a prominent palate closing the throat and longer than the upper lip, spur short. Capsule opening by 2 pores with deciduous lids. Seeds rounded or ovoid-truncate, wingless, tuberculate or honeycombed.

A small Old World genus of about 30 species.

***Kickxia elatine* (L.) Dum.**—Annual. Stems procumbent, much branched, 2–6 dm across, somewhat glandular-pubescent. Leaves oval, the lowest opposite, more or less dentate, the middle and upper alternate, hastate. Pedicels glabrous, filiform longer than the sagittate bracts, deflexed. Calyx lobes lanceolate. Corolla up to 1 cm long, pale yellow, upper lip violet, spur straight. Capsule globose; seeds strongly honeycombed.

Waste places, sandy shores, etc.; Europe, naturalized quite widely in the eastern United States. Apparently established near Sidney and Victoria.





Canker-root (*Kickxia elatine*).

LIMOSELLA L. Mudwort

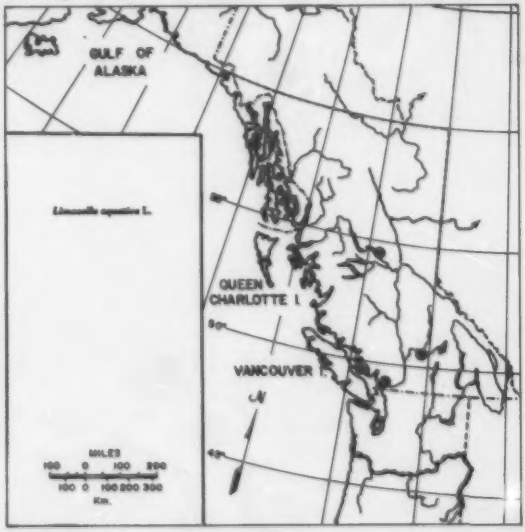
Small, annual herbs. Stems prostrate, forming colonies by rooting at each node. Leaves largely basal. Peduncles few to several, basal, 1-flowered. Calyx campanulate. Corolla campanulate, minute, white or suffused with pink, regular, the 5 lobes shorter than the tube. Stamens 4, anther-sacs confluent into 1. Capsule globose to ovoid, many-seeded.

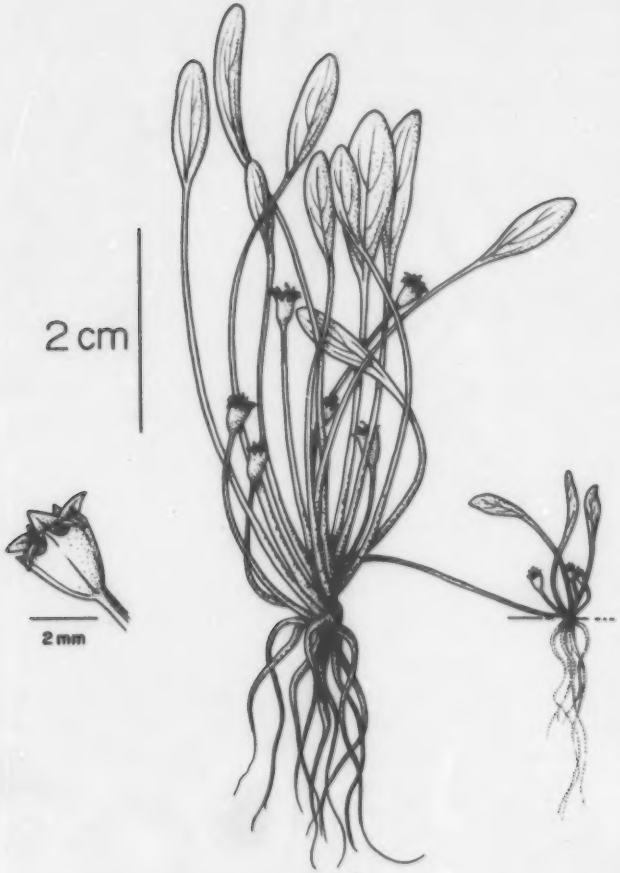
Some 10 species, nearly cosmopolitan.

Leaf blades elliptic or oval on long, spreading petioles; capsule obovoid; corolla lobes acute or acutish; fruiting pedicels mostly spreading ..... *L. aquatica*

Leaf blades not distinguishable from the subulate, erect or ascending petioles; capsule globose; corolla lobes rounded; fruiting pedicels arcuately decurved ..... *L. subulata*

1. ***Limosella aquatica*** L.—Plants densely floriferous, stoloniferous, usually surrounded by many secondary plantlets. Leaf blades oblong to elliptic, about 1.5 cm long, abruptly or cuneately narrowed to petioles as much as 4 times the length of the blades.





Mudwort (*Limosella aquatica*).

Pedicels not more than half the length of the petioles. Corolla about 2 mm wide, lobes acute or acutish, style less than 0.5 mm long, strongly decurved. Capsule obovoid, fruiting pedicels mostly spreading.

Muddy shores of streams and ponds; widespread in the Northern Hemisphere. Collected in a limited number of places in British Columbia; probably more common but overlooked.

2. *Limosella subulata* Ives—Leaves linear, obtuse, up to 5 cm long, not differentiated as to petiole and blade; petioles erect or ascending. Peduncles shorter than the leaves. Corolla about 3 mm wide, the lobes rounded; style about 1 mm long, straight or slightly curved. Capsule globose, fruiting pedicels arcuately curving.

Muddy or sandy shores between tide levels; on both the Atlantic and Pacific coasts, Eurasia. Known with us only from the Alberni area.

Awl-leaved mudwort (*Limosella subulata*).

LINARIA Mill. Toadflax

Annual, biennial, or perennial herbs, almost always glabrous. Flowering stems erect. Leaves numerous, narrow, alternate. Inflorescence of several to many, small to large flowers in terminal racemes. Calyx deeply 5-parted. Corolla very irregular, spurred at the base, strongly bilabiate, the upper lip erect, 2-lobed, the lower 3-lobed, some species with a conspicuous elevated palate which closes the throat of the corolla (native species lack the palate); stamens 4; capsule ovoid to globose.

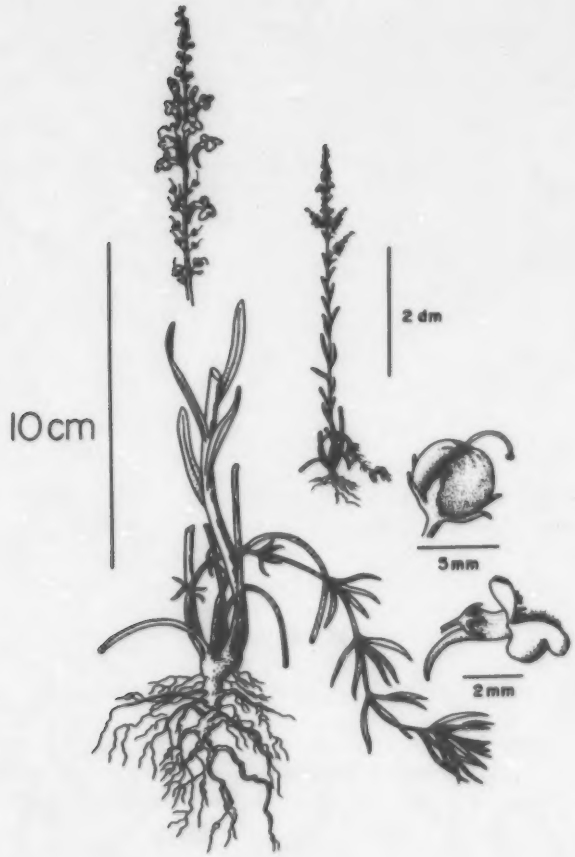
About 100 species, nearly all native to Eurasia.

Flowers all or predominately yellow.
- Leaves linear, narrowed to a petiole-like base; calyx lobes ovate, broadest at base ..... *L. vulgaris*
- Leaves linear-lanceolate to ovate-lanceolate, broadest at the sessile base; calyx lobes lanceolate ..... *L. dalmatica*

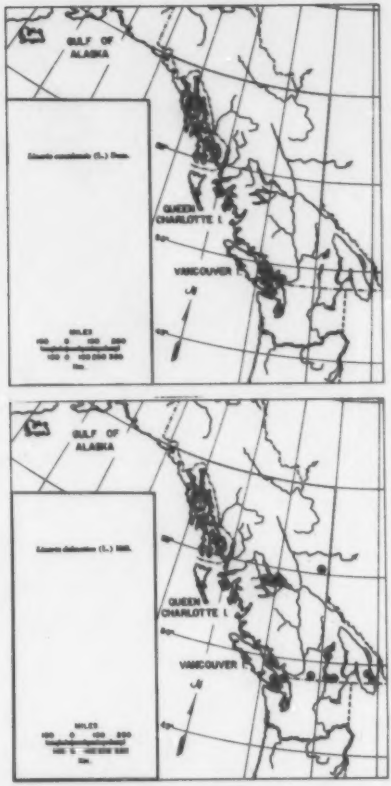
Flowers predominately blue or white.
- Lower lip of the corolla with 2 rounded ridges, but with no definite palate ..... *L. canadensis*
- Lower lip of corolla with a well-developed palate closing the throat ..... *L. purpurea*

1. *Linaria canadenses* (L.) Dum.—Annual. Stems erect, up to 5.5 dm tall, glabrous, usually with a number of procumbent or spreading sterile shoots from the base. Leaves narrowly linear, 1–3 cm long, alternate and widely scattered on the erect stems, opposite or whorled on the spreading shoots. Racemes crowded at anthesis, later elongating; pedicels up to 4 mm long. Corolla rather light blue, lips much longer than the tube, lower lip with 2 short white ridges, spur slender, arcuately and downwardly curved. Capsule ellipsoid-globose.

Sandy places in the open; widespread across the United States and adjacent Canada and Mexico. Locally on southern Vancouver Island, the adjacent Gulf Islands, and the Lower Mainland.

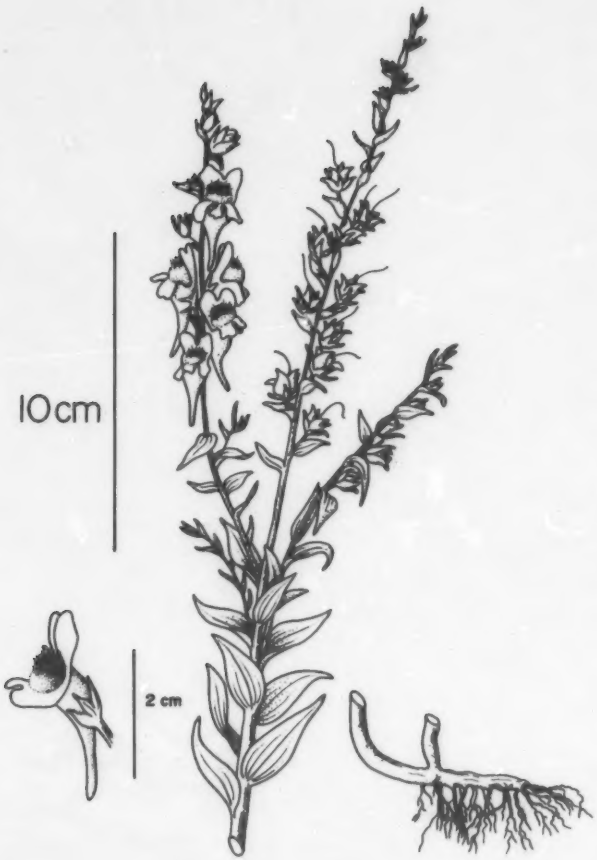


Blue toadflax (*Linaria canadensis*).

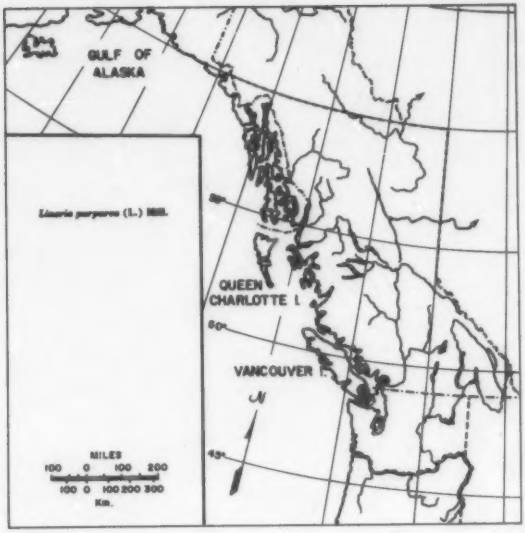


2. *Linaria dalmatica* (L.) Mill.—Coarse perennial. Stems erect, up to 1 m tall, simple or paniculately branched, lower branches sometimes decumbent. Leaves ovate, ovate-lanceolate or oblong, clasping. Corolla yellow, about 4 cm long, spur straight, much shorter than the corolla. Seeds wingless.

Roadside and wasteland; southeastern Europe, adventive and locally established in North America. Locally established in British Columbia.

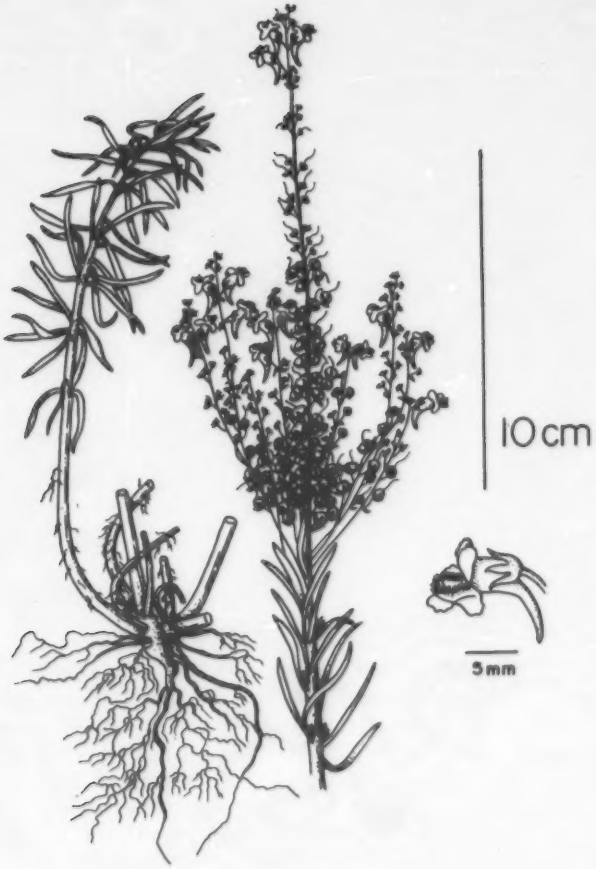


Dalmatian toadflax (*Linaria dalmatica*).

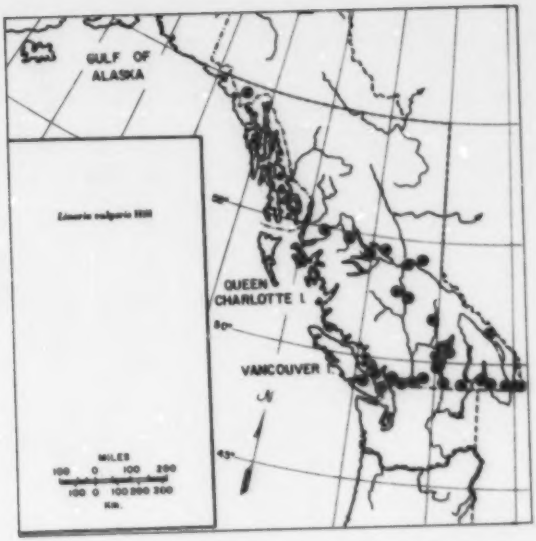


3. *Linaria purpurea* (L.) Mill.—Perennial. Stems erect, up to 1 m tall, branched above, glabrous, glaucous. Leaves linear, or lanceolate, upper 3 to a whorl, more numerous below. Flowers numerous in dense terminal racemes on the stem and branches; pedicels shorter than the linear bracts. Sepals linear, acute. Corolla about 8 mm long, violet, occasionally pink, palate with a beard of white hairs, tube purple-striped, spur long, incurved, more than half as long as the corolla. Capsule longer than the calyx; seed wingless, reticulate.

Waste places; southern Europe, escaped from cultivation in a few places in North America. Occasionally and locally established near Victoria and Vancouver.

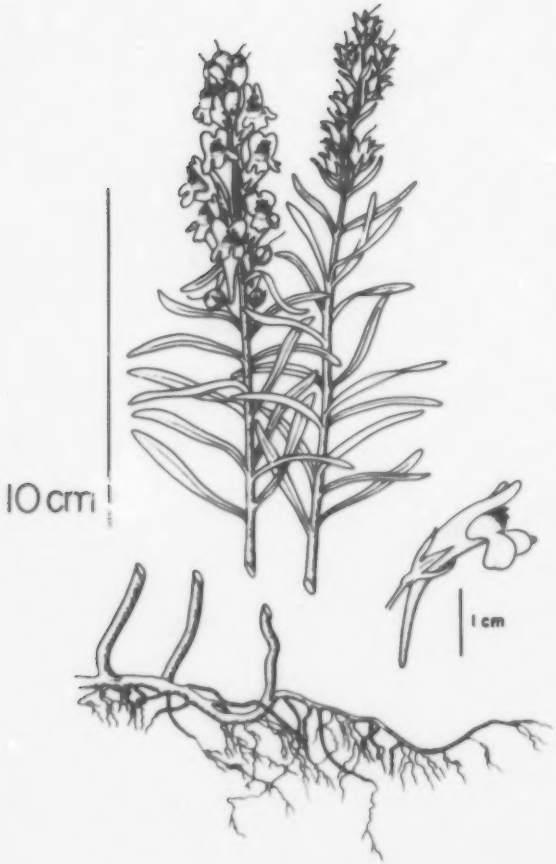


Purple toadflax (*Linaria purpurea*).



4. *Linaria vulgaris* Hill—Perennial. Stems numerous, erect, up to 8 dm tall, branched above, glaucous, glabrous except for some glands in the inflorescence, rhizome creeping. Leaves mostly linear-lanceolate, numerous, more or less alternate. Racemes spike-like, dense with numerous flowers; pedicels longer than the calyx and linear bracts. Sepals ovate or lanceolate, acute. Corolla up to 25 mm long, yellow with orange palate, spur more or less straight, nearly as long as the corolla. Capsule ovoid, more than twice as long as the calyx; seeds papillose, flattened, winged.

Fields, roadsides, and waste places; Europe and western Asia, widely established in North America. Established in a number of areas in British Columbia.



Butter and eggs (*Linaria vulgaris*).

Lindernia All. False Pimpernel

Small annual (ours) or biennial herbs. Leaves opposite, 3- to 5-nerved, entire or denticulate, sessile, mostly subtending flowers. Flowers small, white or purplish, solitary in the axils of leaves, bractless, pedicellate. Calyx regular, sepals, 5, nearly or quite free. Corolla 2-lipped, the upper erect, shallowly 2-lobed, much narrower than the lower, the lower 3-lobed, more or less deflexed; fertile stamens (the upper) 2, the lower pair sterile, adnate to the corolla tube for most of their length, terminal portion free appearing as a forked filament; style elongate, stigmas 2, plate-like. Capsule ellipsoid to fusiform, many-seeded.

About 50 species, chiefly in tropical and subtropical regions of both hemispheres.

***Lindernia anagallidea* (Michx.) Pennell** — Annual. Diffusely branched, 1–2 dm tall, slender. Principal leaves ovate or elliptic, broadest at the rounded base, entire or nearly so, not more

than 2 cm long as a rule. Pedicels filiform, all clearly longer than the subtending bracteal leaves. Corolla white or pale lavender, about 7 mm long. Capsule usually longer than the calyx lobes.

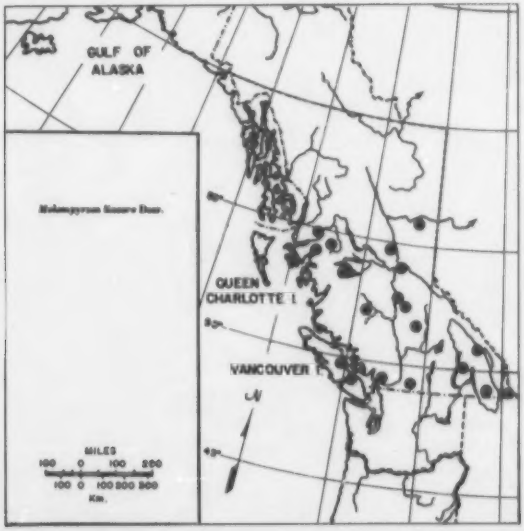
Wet sandy or muddy places; widespread in North and South America. Known only from Osoyoos Lake.

False-pimpernel (*Lindernia anagallidea*).

MELAMPYRUM L. Cow-wheat

Annual herbs. Stems simple or branched. Leaves opposite, the lower entire, the upper mostly toothed at the base. Flowers solitary in the axils of upper leaves. Calyx campanulate, deeply cleft into 4, or sometimes 5, lobes, the upper slightly longer. Corolla tube cylindrical, enlarging above, longer than the lips, upper lip straight in front, compressed, the lower lip about equalling the upper, erect-spreading, 3-lobed at the apex. Stamens 4, didynamous, ascending under the upper lip, not exserted. Capsule flattened, obliquely ovate; seeds commonly 4.

A small genus of about 15 species, mostly of western Eurasia, with only one in North America.



Melampyrum lineare **Desr.**—Stems simple to well branched, somewhat glandular, up to 5 dm tall. Lower stem leaves, below the branches, often lacking at flowering time, linear to elliptic-ovate, entire, the upper, bracteal leaves, entire or more or less toothed at

Cow-wheat (*Melampyrum lineare*).

base. Calyx teeth less than half the length of the corolla tube. Corolla 5–12 mm long, white, sometimes pale straw-coloured to purplish, palate yellow. Capsule about 9 mm long.

Woods, grassy places, peat bogs, and wet places; British Columbia to Newfoundland, south to Georgia, Virginia, Ohio, Indiana, Minnesota, and northeastern Washington. Throughout British Columbia south from about 55°N.

MIMULUS L. Monkey-flower

Annual or perennial herbs (ours). Leaves opposite, entire or toothed. Flowers axillary. Calyx markedly 5-angled, with prominent and often raised midveins to the rather short lobes. Corolla slightly to strongly 2-lipped, yellow to purple or red, the upper lobe external in bud; stamens 4, didynamous, all with well-developed anthers. Fruit a capsule; seeds numerous.

A genus of about 100 species, best developed in western North America, particularly in the southwest, also occurs in Asia, Africa, and Australia.

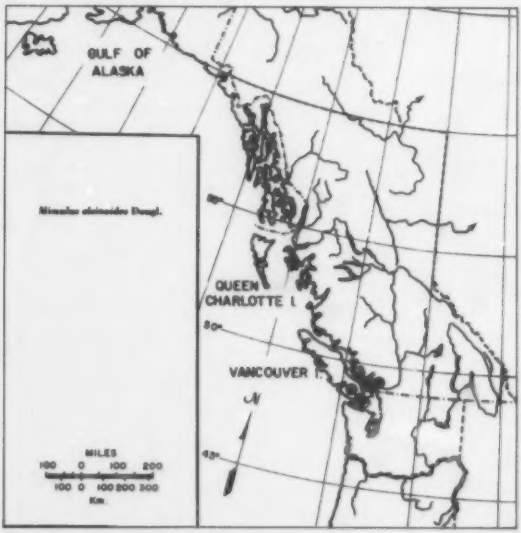
GRANT, A. A monograph of the genus *Mimulus*. Ann. Mo. Bot. Gard. **11**:99–388. 1924.

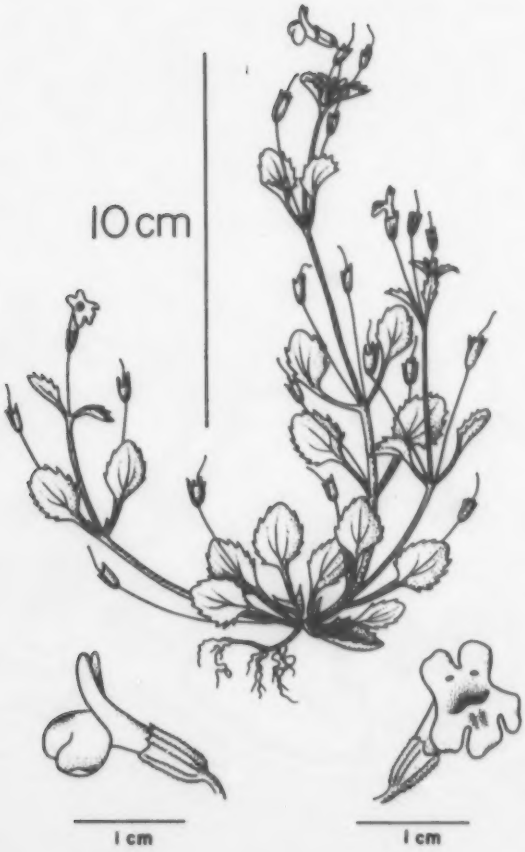
1. Calyx nearly regular, its lobes equal or the upper a little longer.
   2. Corolla yellow or light purple, mostly under 3.5 cm long; calyx usually less than 1.5 cm long.
      3. Calyx lobes one-third to one-half as long as the tube, narrow, the uppermost sometimes longer; leaves slimy-villous; corolla yellow; 1.5–2.5 cm long ..... *M. moschatus*
      3. Calyx lobes less than one-third the length of the tube, triangular-subulate or rounded, the upper not longer; corolla less than 2 cm long.
         4. Cauline leaves distinctly petioled, the base nearly truncate to cordate; corolla yellow, 2–3 times as long as the calyx.
            Calyx lobes all alike, triangular, acute or acuminate; stems white-villous ..... *M. floribundus*
            Calyx lobes not all alike, the upper a little longer, rounded or mucronate; stems puberulent ..... *M. alsinoides*
         4. Cauline leaves short-petioled, narrowed toward the base.
            Corolla yellow; plants glandular-puberulent or glabrate ..... *M. breviflorus*
            Corolla reddish; plants glandular-pubescent ..... *M. breweri*

2. Corolla purplish-red, 3–5 cm long; calyx 1.5–3.0 cm long; anthers strongly pubescent ..... *M. lewisii*

1. Calyx decidedly irregular, the upper lobe the longest, the lower curved upward; corolla yellow.
   Flowers 1–5, axillary or terminal; stems from a mat of yellowish rootstocks; alpine species ..... *M. tilingii*
   Flowers usually more numerous and more or less racemose; rootstocks commonly not matted; mainly not alpine plants ..... *M. guttatus*

1. *Mimulus alsinoides* Dougl.—Annual. Stems nearly glabrous, erect, simple or more often diffusely branched, up to 30 cm long. Leaves broadly ovate, or rhomboid-ovate, 1–4 cm long, thin, glabrous, yellowish-green, irregularly dentate, 3- to 5-nerved; petioles long-margined, at least as long as the blades; internodes and the erect or spreading filiform pedicels usually longer than the leaves. Calyx 4–6 mm long, minutely puberulent, longer in fruit but not inflated, teeth unequal, the 2 lower truncate and longer than the 3 short, triangular-acute or mucronate, upper ones. Corolla 2-lipped, funnelform, about 1 cm long, yellow, tube slightly



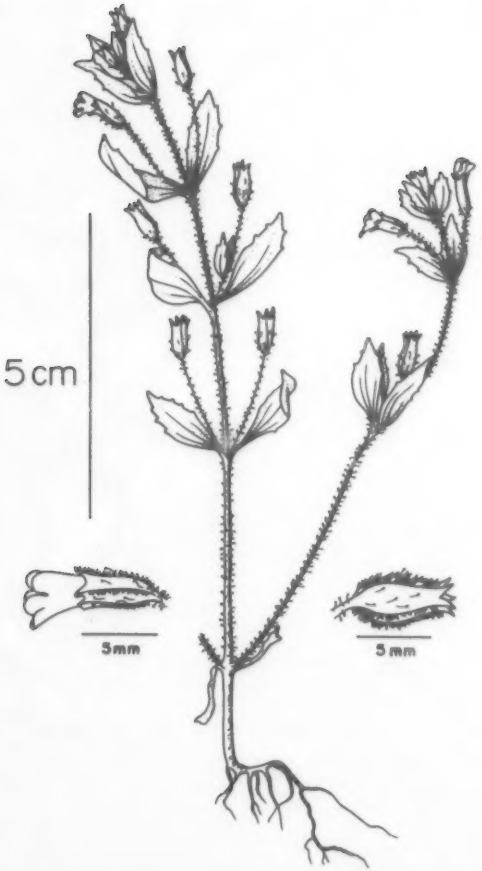


Chickweed monkey-flower (*Mimulus alsinoides*).

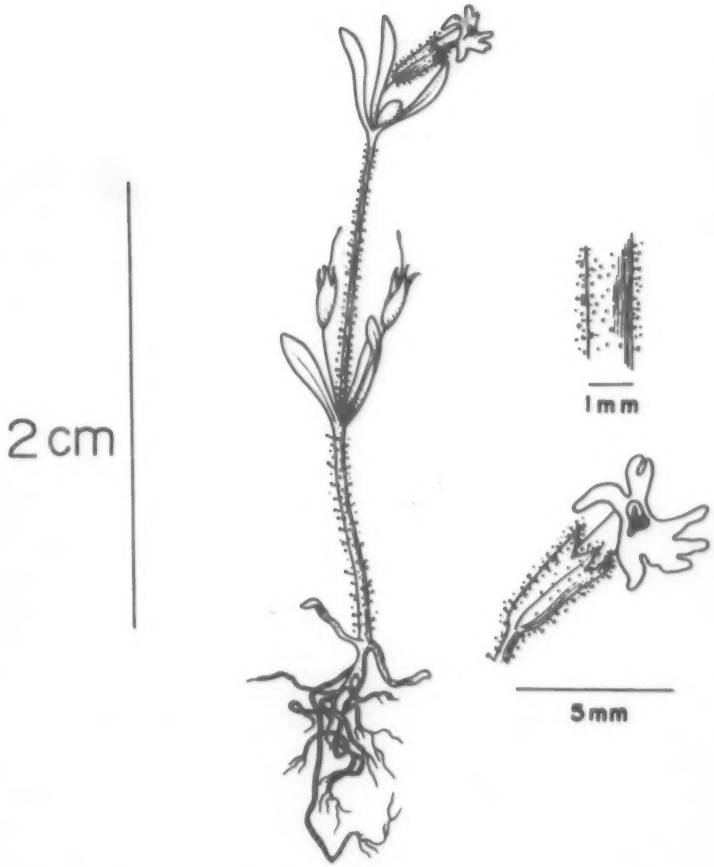
exserted, the middle lobe of the lower lip spreading and nearly twice as long as the lateral lobes and the 2 erect upper ones and with a large reddish spot near its base; stamens glabrous. Capsule oblong-acuminate, usually slightly exserted.

Wet places, particularly in moss on cliffs, southwestern British Columbia to northern California, west of the Cascades. Southern Vancouver Island or adjacent islands and Mainland.

2. *Mimulus breviflorus* Piper—Annual. Stems slender, up to 20 cm tall, freely branched, branches closely ascending, minutely glandular-puberulent. Leaves mostly elliptic or rhombic-elliptic or the upper nealy orbicular, entire or toothed, 5–13 mm long, 3-nerved from the base, gradually tapering to a slender petiole, or some sessile. Peduncles filiform, closely ascending, usually longer than the leaves. Calyx nearly tubular, glandular-puberulent, about 5 mm long, teeth triangular, acute, minutely ciliate. Corolla pale yellow, faintly spotted, nearly regular, scarcely 2-lipped, lobes broad



Short-flowered monkey-flower (*Mimulus breviflorus*).



Brewer's monkey-flower (*Mimulus brewerl*).

and rounded, usually slightly longer than the calyx. Capsule about equalling the calyx.

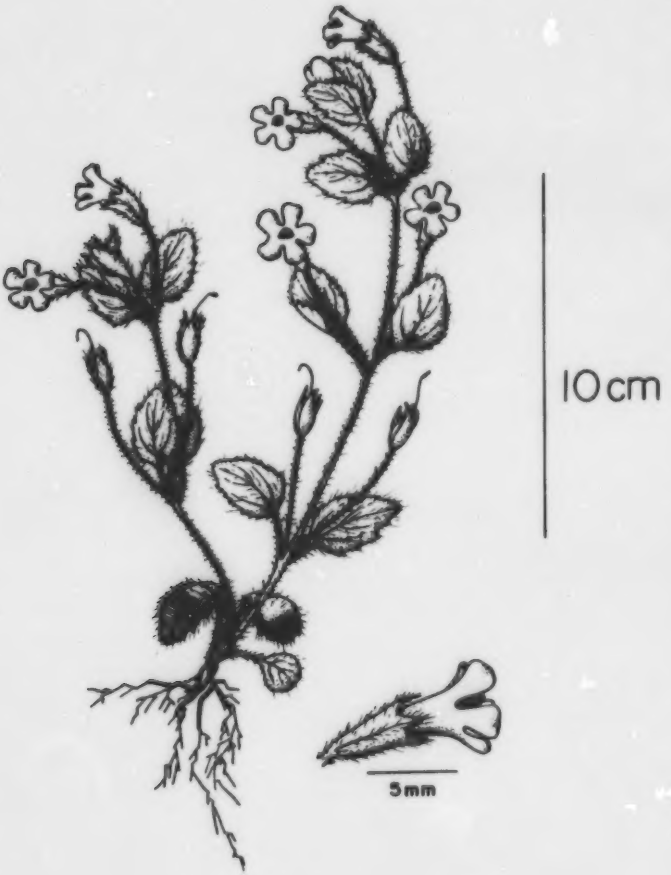
Damp, open places; Washington to central Oregon, east of the Cascades to eastern Idaho. Rare in the southern Interior.

3. *Mimulus breweri* (Greene) Rydb.—Annual. Stems to 15 cm tall, simple or with numerous ascending branches, whole plant glandular-puberulent or pubescent. Leaves oblong or linear, 1–2 cm long, 1–4 mm wide, obtuse, entire or indistinctly toothed, tapering to a short, slender petiole but commonly almost sessile, 1-nerved. Flowers numerous; pedicels slender, up to 10 mm long, usually longer than the calyx; calyx cylindrical, slightly spreading at the top, often reddish or spotted with red, more or less distended by the mature capsule, teeth subequal or the upper somewhat longer, broadly triangular-acute; corolla funnelform, little exceeding the calyx, pale pink to rose-red or red, glabrous externally, tube mostly included, throat short, with a few scattered hairs, sometimes with 2 yellow lines below the lower lip, the lobes sub-

equal, often with a red spot at the base of each; stamens exserted, unequal, glabrous; style glabrous, nearly as long as the upper pair of stamens; capsule about as long as the calyx, oblong, acute.

Damp, sandy soil at moderate elevations in the mountains; in and east of the Cascades from southern British Columbia to Idaho, south to California, Montana, and Wyoming. Known with us only from near Rossland.

4. *Mimulus floribundus* Dougl.—Annual. Stems up to 50 cm tall, viscid-villous, more or less slimy, diffusely branched from the base, rather weak, often climbing over moist rocks. Leaves scattered, thin, ovate to ovate-lanceolate, up to 5 cm long, mostly truncate or subcordate, dentate with short salient teeth, ciliate 3- to 5-nerved from the base, usually shorter than the internodes. Pedicels filiform, frequently shorter than the leaves, more or less spreading in fruit. Calyx 4–7 mm long, becoming longer and broadly ovate in fruit, often spotted or tinged with red. Corolla yellow, cylindrical or funnel-form, throat short, dotted or streaked

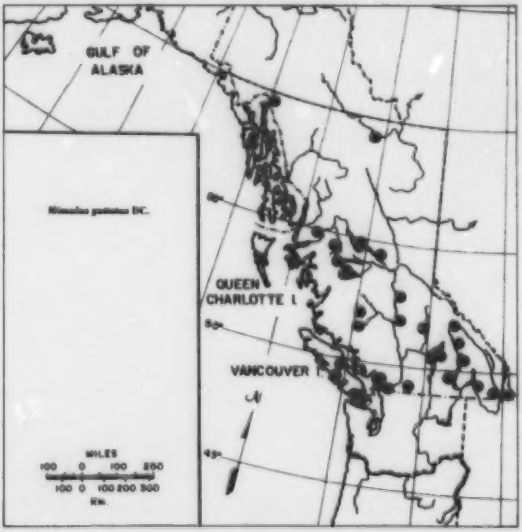


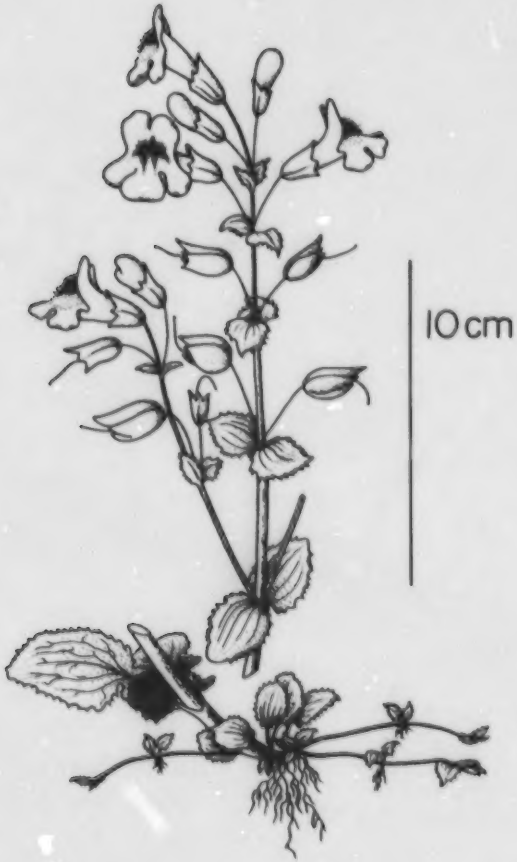
Purple-stem monkey-flower (*Mimulus floribundus*).

with red, lobes unequal, mostly erect; stamens and style glabrous, included. Capsule shorter than the calyx.

Damp places in the mountains; southern British Columbia south to California and Colorado. Rare in the southern Interior.

5. *Mimulus guttatus* DC.—Annual, or perennial by stems rooting at the nodes, by creeping rootstocks or by stolons. Stems stout and erect or weak and more or less reclining, up to 55 cm tall, mostly simple, commonly glabrous and puberulent or pubescent above. Leaves variable, mostly rounded-ovate or ovate-oblong, up to 15 cm long, many-nerved, coarsely and irregularly dentate, often with small projections at the base of the blade; petioles usually much longer than the blades, upper leaves sessile; internodes generally longer than the leaves. Inflorescence mostly racemose, sometimes solitary or few-flowered; pedicels less than twice as long as the calyx, rarely slender and elongated. Calyx glabrous or pubescent, campanulate, often dotted or tinged with red, 8–17 mm long, longer and much inflated in fruit, teeth short, upper tooth



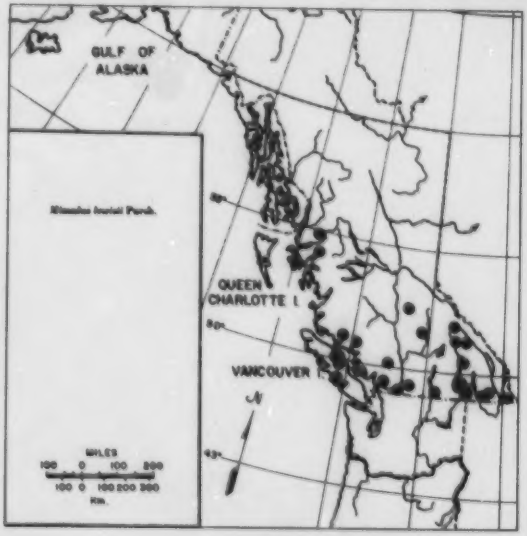


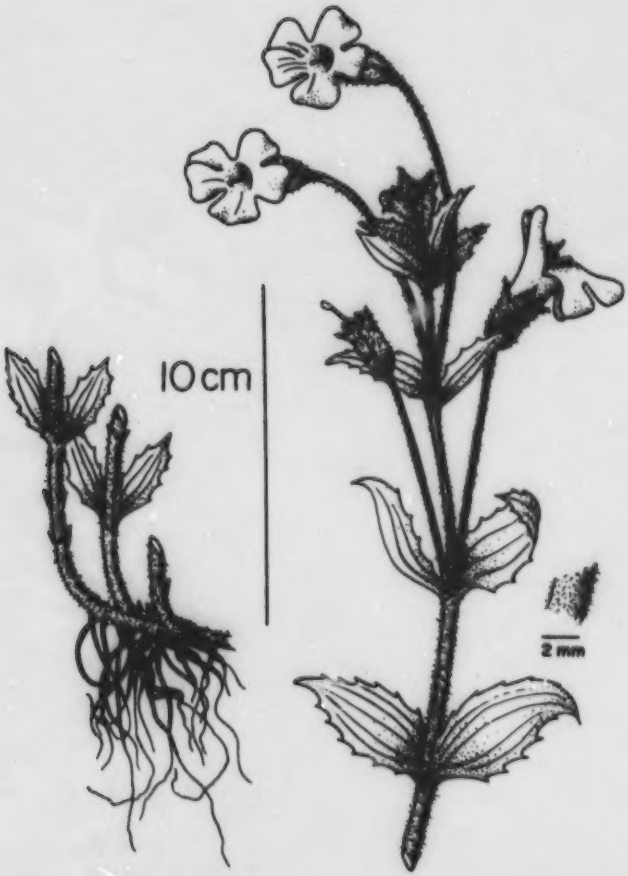
Yellow monkey-flower (*Mimulus guttatus*).

longer. Corolla up to 4 cm long, yellow, the throat usually spotted with red, ridges densely hairy, nearly closing the throat, strongly 2-lipped. Capsule broadly oblong, constricted at or short stipitate.

Common in wet places from sea-level to moderate altitudes; in mountainous regions of western North America from Alaska and Yukon, south to New Mexico. Common throughout the Province.

6. ***Mimulus lewisii*** **Pursh**—Perennial. Stems stout, clustered from a running rootstock, up to 7.5 dm tall, mostly simple, whole plant more or less viscid-pubescent. Leaves thin, oblong or oblong-lanceolate to ovate-oblong, up to 7 cm long, 3- to 5-nerved from the base, irregulaly dentate with short, subulate teeth, sometimes almost entire, sessile by a broad base. Pedicels erect, usually much longer than the leaves. Calyx tubular or somewhat campanulate, often tinged or dotted with red, 15–25 mm long, sharply angled, teeth subequal, broadly triangular at base, becoming subulate, about 5 mm long. Corolla 33–55 mm long, rose-red to pale pink, occasionally white or yellowish-white, with darker lines down



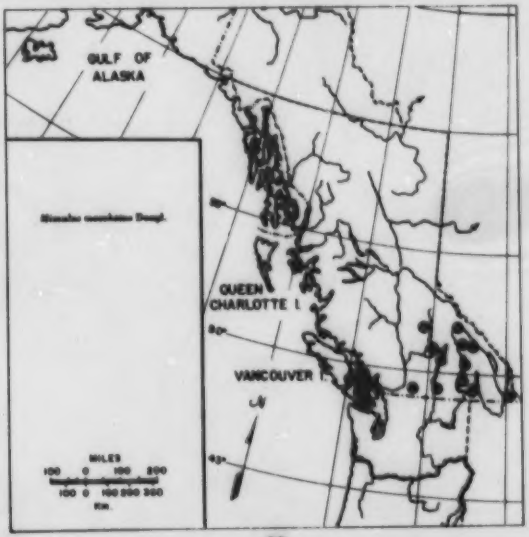


Great purple monkey-flower (*Mimulus lewisii*).

the throat, often more or less blotched with red, lobes rounded, subequal, tube exserted, yellow or white below the lower lip, throat sparingly bearded; stamens included, filaments glabrous, anthers more or less villous on the back; style slightly longer than the stamens. Capsule oblong, included.

Along streams above mid-altitudes; southern British Columbia and Alberta, south to California, Montana, Wyoming, and Utah. Common south of about Lat. 55°N.

7. ***Mimulus moschatus*** **Dougl.**—Perennial. Herbage more or less slimy, viscid-villous. Rootstocks slender, often moniliform; stems creeping or decumbent, up to 30 cm long, rooting at the lower nodes. Leaves ovate, 1–4 cm long, entire or sparingly denticulate, base sometimes subcordate or nearly truncate, short-petioled, pinnately veined. Flowers few, pedicels slender, shorter than the leaves. Calyx campanulate, teeth unequal, lanceolate, acute, often subulate, often nearly one-third the length of the tube. Corolla yellow, funnelform, about 2 cm long, tube cylindrical,

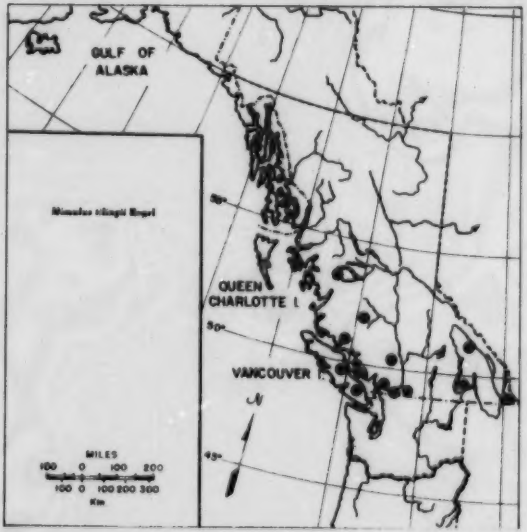


Muskflower (*Mimulus moschatus*).

exserted, throat short, usually stiped with red and with two densely bearded lines below the lower lip; stamens included, filaments glabrous, anthers pubescent. Capsule acuminate.

Moist places in mountains; southern British Columbia to Montana, south to California, Montana, and Wyoming. General in southern British Columbia.

8. *Mimulus tilingii* Regal—Perennial. Low creeping, stems from a mass of yellowish rootstocks, up to 20 cm long, usually freely branched, more or less weak, commonly stoloniferous, glabrous or pubescent above. Leaves few, light green, broadly elliptical to broadly ovate, the lower generally short-petioled, the upper sessile, 3- to 5-nerved from the base, irregularly dentate. Flowers few, mostly terminal; pedicels at least 2½ times the length of the mature calyx; ascending, occasionally recurved, slender, puberulent or pubescent. Calyx broadly campanulate, 8–14 mm long, inflated in fruit, generally tinged and thickly dotted with red, teeth broadly ovate, blunt, unequal, the lower usually longer than the lateral, the



Large mountain monkey-flower (*Mimulus tilingii*).

upper at least twice as long as the others, villous at the sinuses. Corolla 2.0–3.5 cm long, yellow, broadly funnelform, throat densely bearded and dotted with red, palate prominent, sometimes nearly closing the throat. Capsule oblong or oval, about half the length of the calyx.

At the edge of or in mountain streams and rivulets at high altitudes; southern British Columbia and Montana, south to California and Colorado. General south of about Lat. 55°N.

ORTHOCARPUS Nutt. Owl-clover

Slender, annual, root-parasites. Stems erect (ours). Leaves alternate, sessile, narrow, entire or pinnately lobed or divided. Inflorescence bracteate, dense, spike-like. Calyx tubular, 4-cleft, usually more deeply so on the lower side, the lobes shorter than the tube. Corolla narrowly tubular, strongly 2-lipped, the beak-like upper lip (galea) scarcely longer than the broader, much inflated, sac-like lower lip which is tipped with 3 small teeth. Stamens 4, attached near the top of the tube; anthers usually explanate, 2-celled or 1-celled through the lower, becoming obsolete. Capsule shorter than the calyx.

A genus of about 25 species mostly limited to western North America.

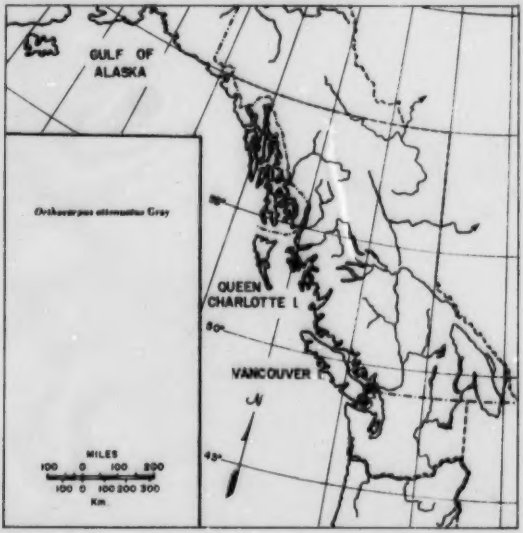
KECK, D. A. A revision of the genus *Orthocarpus*. Proc. Calif. Acad. Sci. IV. **16**:517–571. 1927.

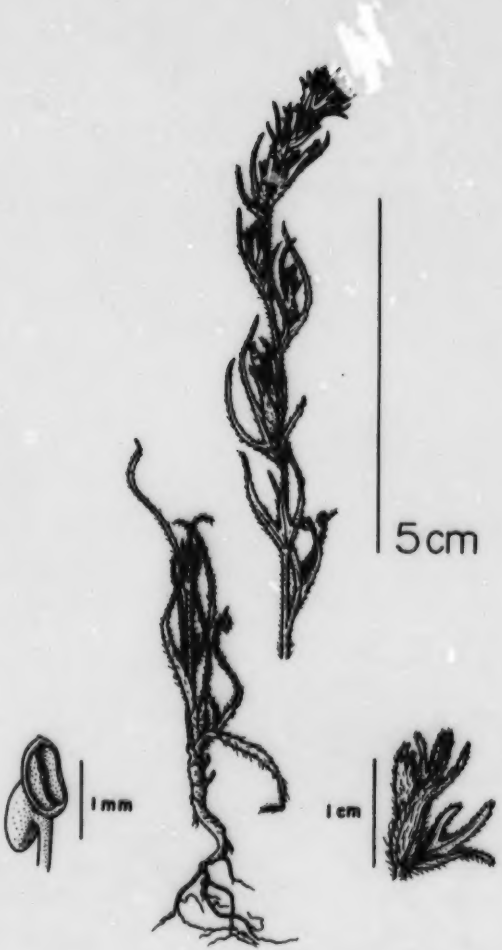
1. Anthers 2-celled.
   2. Corolla more or less 3-saccate; seed coat loose fitting.
      3. Bracts green throughout; corolla deeply 3-saccate; galea equalling or barely exceeding the lower lip; teeth inconspicuous..... *O. hispidus*
      3. Bracts tipped with purple or yellow; galea exceeding the lower lip; teeth erect.
         Corolla wider above, the lower lip more than 2 mm deep; spike usually conspicuous, wider than the spread of leaves; corolla yellow with purplish markings; saline or brackish places ..... *O. castillejoides*
         Corolla linear, lower lip 2 mm or less deep; spike inconspicuous; corolla whitish with prominent purple spots on the lower lip; usually not in saline situations ..... *O. attenuatus*

2. Corolla simply saccate or nearly so; seed coat tight-fitting or ridged.
   4. Bracts and calyx strongly glandular-pubescent; style glabrous under magnification.
      Corolla yellow; lower lip with definite short teeth ..... *O. luteus*
      Corolla white or purplish; lower lip lacking teeth ..... *O. bracteosus*
   4. Bracts and calyx not glandular-pubescent; style finely pubescent under magnification ..... *O. tenuifolius*

1. Anthers 1-celled.
   Branches divergent from the erect central axis; flowers showy, usually exserted, conspicuous; galea straight or gradually curved; tube densely pubescent; bracts pinnatifid ..... *O. faucibarbatus*
   Branches many, weak, ascending from the base, central axis indistinct; flowers minute, inconspicuous; galea sharply curved; tube glabrous; bracts often 2-pinnatifid ..... *O. pusillus*

1. *Orthocarpus attenuatus* Gray—Stem slender, erect, up to 3.5 dm tall, usually unbranched or branching from the base, pubescent. Leaves sessile, linear-lanceolate, attenuate or with two lateral, filiform lobes, pubescent, 2–6 cm long. Spike dense or





Narrow-leaved owl-clover (*Orthocarpus attenuatus*).

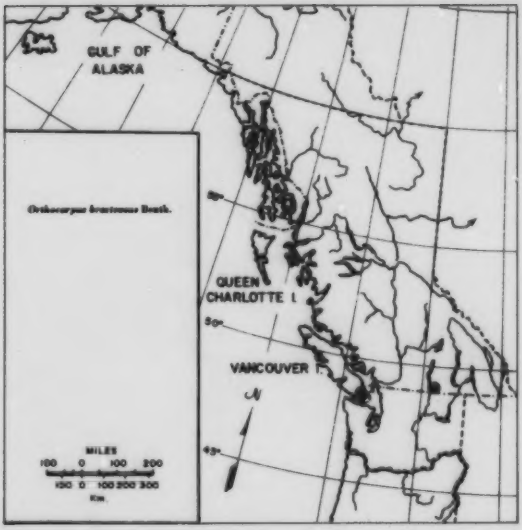
more open below, up to 20 cm long, green; bracts 15–20 mm long, 3-lobed, lobes two-thirds total length of bract, white-tipped. Calyx about 22 mm long, exceeding tube of corolla, very pubescent toward the 4 lobes, white-tipped. Corolla white with prominent purple spots on lower lip, pubescent, 10–25 mm long, lower lip 3–4 mm long, teeth 1 mm; galea equalling the teeth or slightly exceeding them, subulate. Stamens glabrous; style glabrous, inserted within the galea. Capsule elliptical, seeds less than 1 mm long, brown with loose-fitting reticulate coat.

Open, grassy places; southern Vancouver Island to California west of Cascades. Found near Victoria and on some Gulf Islands.

2. *Orthocarpus bracteosus* Benth.—Stems up to 4 dm tall, erect, slender, simple or branching above, pubescent, somewhat glandular, yellow, brown, or purplish. Leaves 1.5–3.5 cm long, linear to lanceolate, green, glandular-pubescent, entire below, divided with two lateral lobes above, lobes linear-lanceolate. Spike compact, up to 15 cm long; bracts obtuse or rounded at the base, green or tinged with purple, 10–20 mm long, divided two-thirds of the way down by 2 or 4 lanceolate, divaricate lobes, central lobe exceeding the lateral lobes, glandular-pubescent with soft hairs. Calyx 6–10 mm long, green, glandular-pubescent with long soft hairs, split half way down each side, these segments again split into acuminate lobes. Corolla rose-purple, well exserted from the spike, up to 20 mm long, tube longer than the calyx, gradually swelling out into the lower lip, lower lip about 6 mm long, covered with short, fine hair, simply saccate; galea wide, scarcely exceeding the lower lip, strongly pubescent, beak papery, about 5 mm long. Capsule elliptical, seeds about 3 mm long, the reticulated coat ridged.

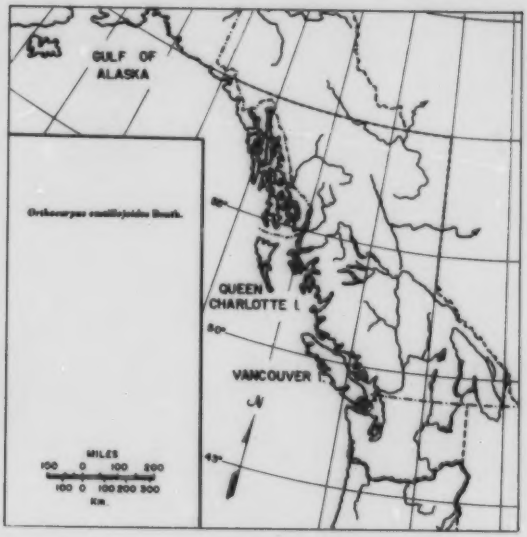
Grassy places at low elevations; southern British Columbia to northern California. Known from Victoria and Sidney, a specimen from Bridesville may be an introduction.

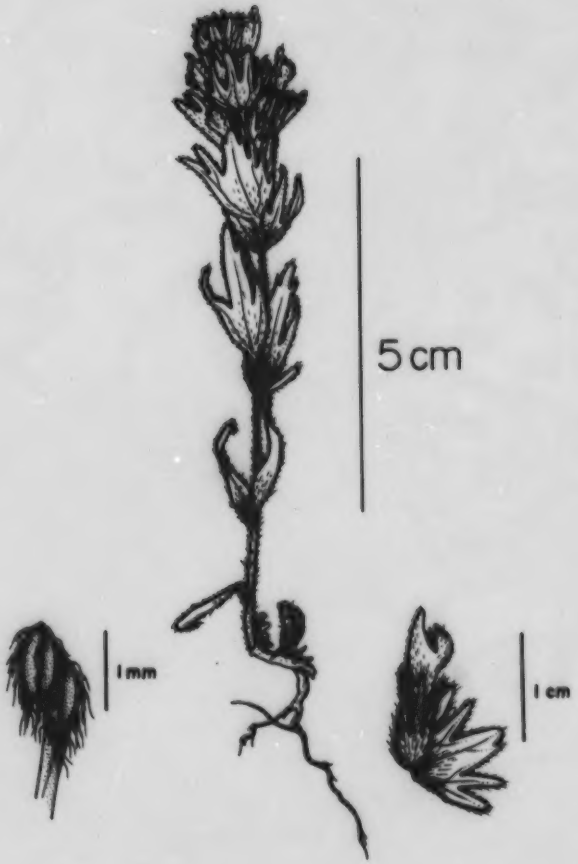
Rosy owl-clover (*Orthocarpus bracteosus*).



3. *Orthocarpus castillejoides* Benth.—Stems up to 3.5 dm tall, simple or often branched, puberulent to hirsute. Leaves 1–5 cm long, widely lanceolate, pinnately toothed with 1 or 2 pairs of rather short lanceolate lobes above, entire below, scabrous-puberulent. Spike often more or less capitate; bracts tipped with white, yellow, or pinkish, 14–22 mm long, oblong to ovate, palmately cleft into 2–8, obtuse or truncate, lateral lobes. Calyx 12–20 mm long, deeply parted in back, cleft in front, each lobe with a pair of linear attenuate or rounded teeth, villous, tipped with same colour as the bracts. Corolla yellow with purple markings, exceeding the bract and calyx, tube sparingly hirsute, gradually expanding into the lower lip, lower lip 4–6 mm long, 3-saccate, teeth obtuse, erect; galea straight or slightly curved, exceeding the lower lip, margins membranous, tip obtuse, filaments glabrous, anthers sparsely ciliate; pistil glabrous, stigma exserted from tip of galea. Capsule brown, elliptical, seeds large, yellowish, enclosed in loose reticulate coat.

Saline soils along the Coast; southern Vancouver Island to central California. Southern Vancouver Island.

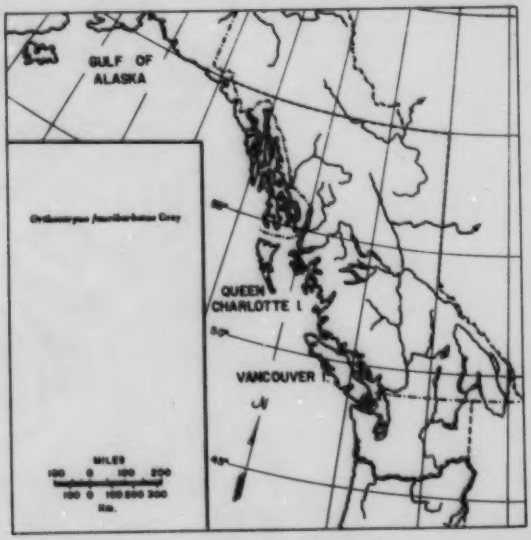




Paintbrush owl-clover (*Orthocarpus castillejoides*).

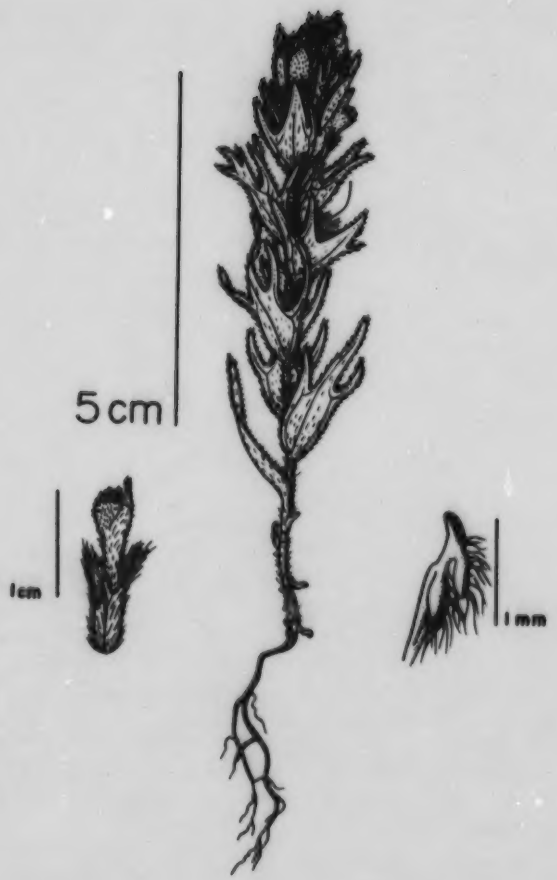
4. *Orthocarpus faucibarbatus* Gray—Stems up to 5 dm tall, simple or often branched, straw-coloured, glabrous up to the inflorescence, where they become puberulent. Leaves 2–8 cm long, linear-lanceolate, pinnately divided into filiform lobes. Spike elongated, bracts gradually differing from the leaves. Corolla 12–22 mm long, clear yellow or whitish, often fading pinkish, tube much exserted, densely pubescent, lower lip with a number of purplish dots on each margin.

Grassy places; southern Oregon to central California. Vicinity of Victoria, where almost certainly introduced.

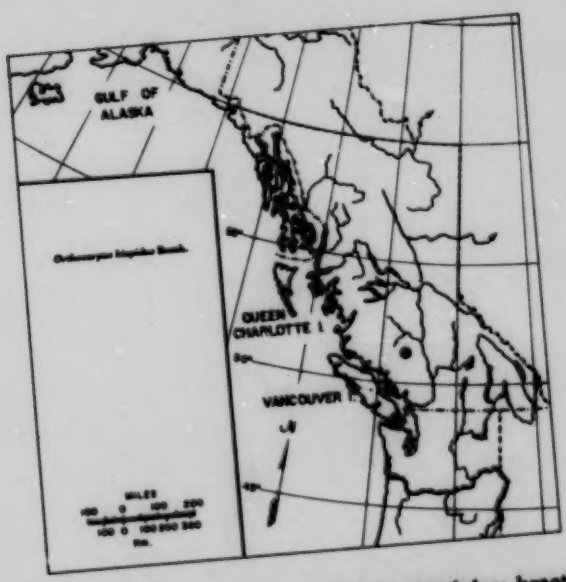


5. *Orthocarpus hispidus* Benth.—Stems slender, erect, up to 4 dm tall, simple or with a few erect branches, hirsute-pubescent. Leaves 1–4 cm long, pubescent, lower linear, entire, upper lanceolate, 3- to 5-cleft. Spike slender, compact, up to 15 cm or more

Smooth owl-clover (*Orthocarpus faucibarbatus*).



5 **Hairy owl-clover (*Orthocarpus hispidus*).**

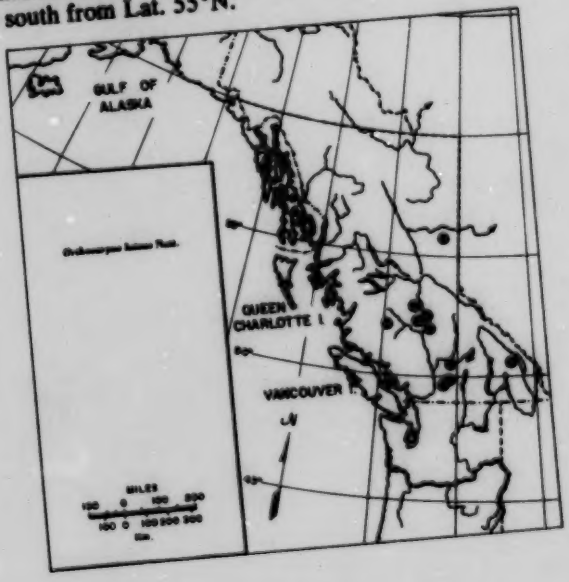


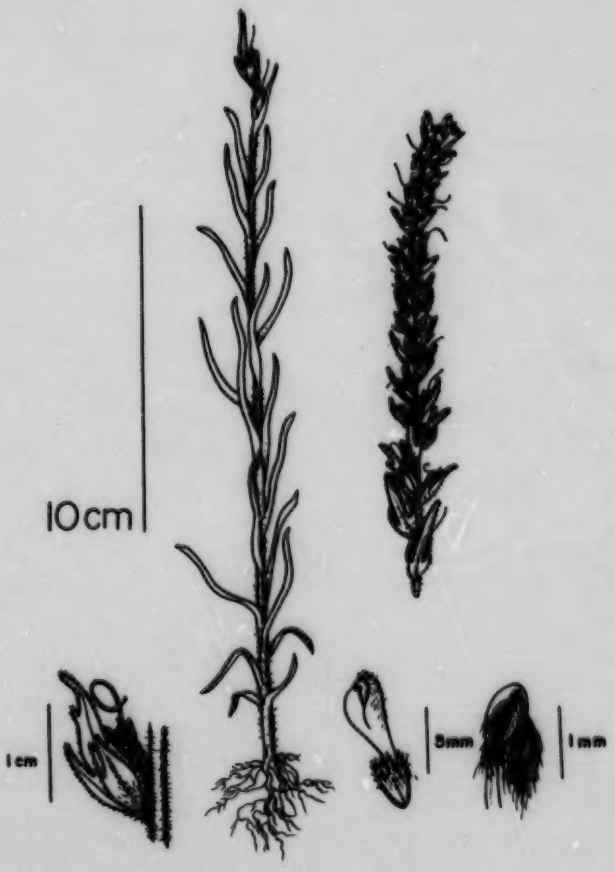
long, hirsute to pilose, sometimes slightly glandular; bracts 10–25 mm long, ovate, 3- to 7-cleft into attenuate lobes. Calyx about 9 mm long, 2-cleft, each lobe divided into 2 attenuate teeth. Corolla white or yellow, 12–20 mm long, pubescent, exceeding the bract but not usually extending beyond the tip of the spike, lower lip small, 3–4 mm long, teeth small, oblong, galea straight or curved, 4–5 mm long, lanceolate, margins on ventral side glabrous, slightly exceeding the lower lip; stamens enclosed in the galea, anthers pubescent, filaments glabrous; pistil included in the galea, glabrous. Capsule oblong, brown, 5–8 mm long, seeds small, brown, in a loose, reticulate coat.

Moist grassy sites up to moderate elevations; southern British Columbia to southern California, east to Idaho and Nevada; introduced weed at Skagway, Alaska. Known from Victoria and Chilcotin, where it may be introduced.

6. *Orthocarpus luteus* Nutt.—Stems erect, up to 3.5 dm tall, strict, usually simple or branching near the top, pubescent. Leaves compact, sessile, linear or linear-lanceolate, pubescent, usually entire, dark green. Spike more compact than the leaves below, up to 25 cm long; bracts 10–15 mm long, 3-lobed, the central lobe ovate or lanceolate-ovate, the small divergent lateral lobes about half as long as the central lobe, glandular pubescent, dark green. Calyx half as long as the corolla, subequally 4-lobed, glandular-pubescent. Corolla golden-yellow, about 11 mm long, lower lip pubescent, simply saccate, slightly shorter than the galea, teeth minute, galea margins incurved, terminating in a minute hook.

Damp situations up to moderate elevations in the mountains, east of the Cascades; British Columbia to California, east to Manitoba, Minnesota, Nebraska, and New Mexico. General in the Interior south from Lat. 55°N.

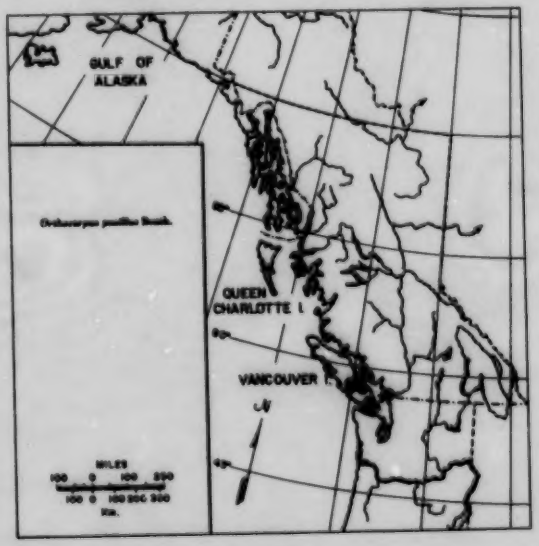


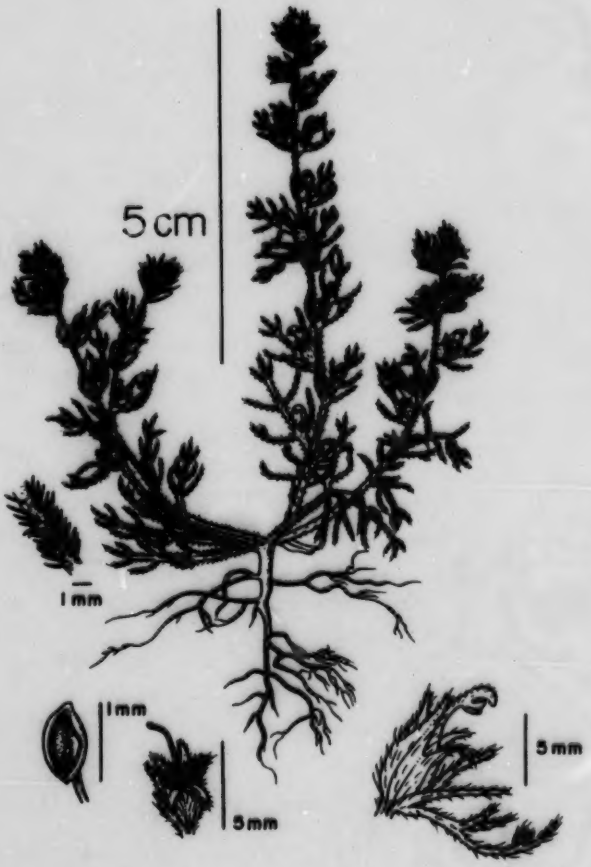


Yellow owl-clover (*Orthocarpus luteus*).

7. ***Orthocarpus pusillus*** **Benth.**—Stem slender, up to 20 cm tall, with many weak, ascending branches from the base, main stem obscure, herbage hispidulous-pubescent with a purplish cast. Leaves linear, 10–30 mm long, with 2–8 filiform, lateral divisions. Spike elongated, often flowering from the base of the stem, flowers scattered; bracts exceeding the flowers, once or twice pinnatifid with 3–6 filiform divisions. Calyx about 6 mm long with 4 subequal, attenuate teeth, becoming papery in fruit. Corolla red-purple, occasionally yellowish, slightly shorter than the calyx, inconspicuous, glabrous, lower lip nearly glabrous, 3-saccate, teeth inconspicuous; galea somewhat hooked at tip, slightly longer than the lower lip, sparingly pubescent; anthers early exserted from the galea. Capsule subspherical, flattened, light brown; seeds many, black.

Damp places at low altitudes; southern British Columbia to California, west of Cascades. Found in southern Vancouver Island and adjacent Gulf Islands.

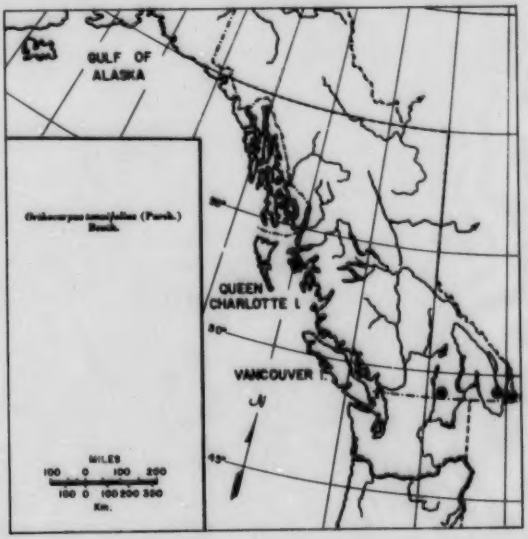


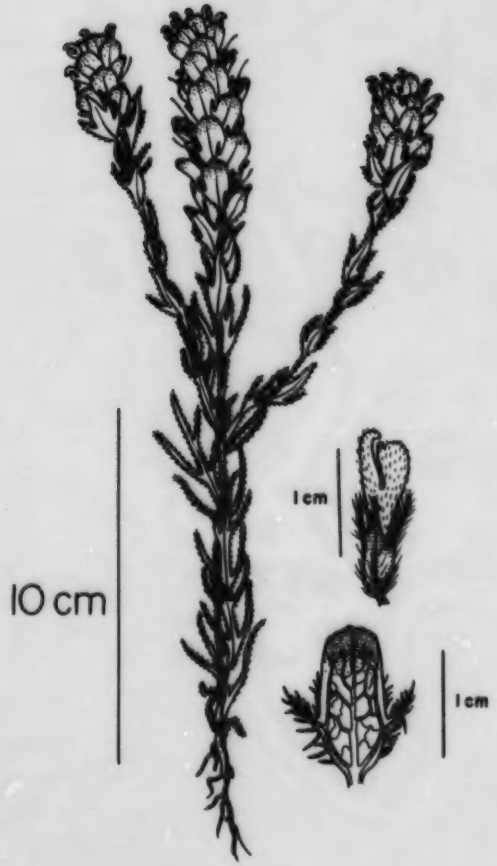


Dwarf owl-clover (*Orthocarpus pusillus*).

8. *Orthocarpus tenuifolius* (Pursh) Benth.—Stems up to 3 dm tall, simple or branched above, herbage puberulent. Leaves as much as 5 cm long, lower mostly narrowly linear, entire, upper with 1 or 2 pairs of slender lobes, bracts broader and blunter, the lower sometimes with a pair of slender lateral lobes, commonly hispid-ciliate, upper entire, conspicuously pink-purple at the petaloid tips. Spikes compact, showy. Calyx 2-cleft with bifid segments. Corolla yellow, sometimes purplish at the tip, 14–20 mm long, lower lip simply saccate, teeth short; galea slightly longer than the lower lip, hooked at tip.

Open places east of Cascades from low to medium altitudes; southeastern British Columbia to central Oregon, east to western Montana. Found only in the south Columbia Valley.





Thin-leaved owl-clover (*Orthocarpus tenuifolius*).

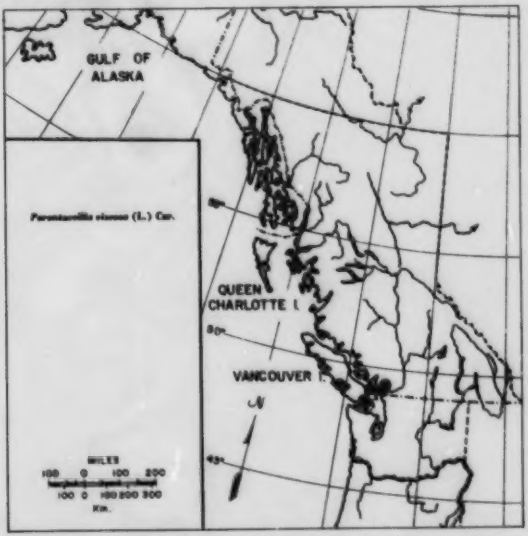
PARENTUCELLIA Viv. Parentucellia

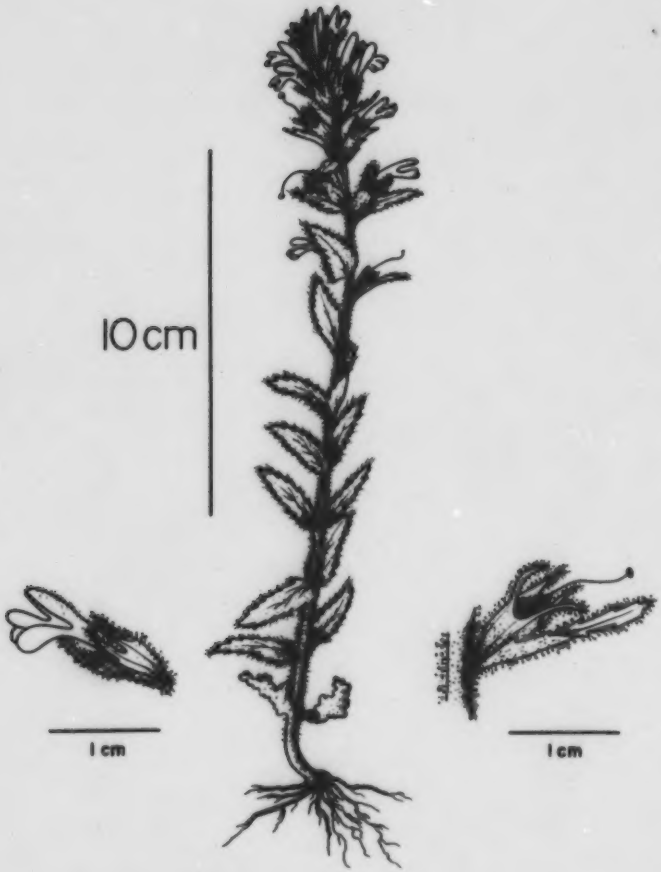
Annual. Herbs with opposite leaves. Inflorescence a terminal spike-like raceme with the flowers in the axils of bracts similar to the leaves. Calyx 4-toothed, tubular. Corolla 2-lipped, the upper lip entire or emarginate, forming a hood, lower lip with 3 entire lobes. Stamens 4, anthers basally aristate. Capsule lanceolate. Seeds many, minute and smooth.

Two species in western Europe and the Mediterranean region.

***Parentucellia viscosa* (L.) Car.**—Stems erect, up to 50 cm tall, usually unbranched, viscid-hairy. Leaves 1.5–4 cm long, lanceolate, dentate, acute, sessile. Calyx-teeth triangular-lanceolate, subacute, about as long as the tube. Corolla about 2 cm long, yellow, the lower lip much longer than the upper; stamens included under the upper lip, anthers hairy. Capsule slightly longer than the calyx-tube.

Damp, grassy places, usually near the Coast; western Europe and the Mediterranean region, adventive locally on the Pacific Coast. Established in a few places in southern British Columbia and adjacent Mainland.





Yellow parentucellia (*Parentucellia viscosa*).

PEDICULARIS L. Lousewort

Perennial (with us perhaps annual in the case of *P. parviflora*) herbs. Leaves alternate, toothed to more often pinnatifid or pinnately dissected. Inflorescence usually spike-like racemes, lax and elongate to capitate. Calyx regularly or often irregularly, cleft, with 5, or less commonly 4 or only 2, lobes. Corolla yellow or white to purple or red, two-lipped, the upper lip (galea) hooded, enclosing the anthers, often extended into a beak, the lower lip shorter, generally 3-lobed. Stamens 4, didynamous; stigma capitate. Capsule glabrous, asymmetrical, mostly arcuate and opening chiefly or wholly on the upper side; seeds several often slightly winged.

A genus of several hundred species, chiefly in the North Temperate and boreal regions.

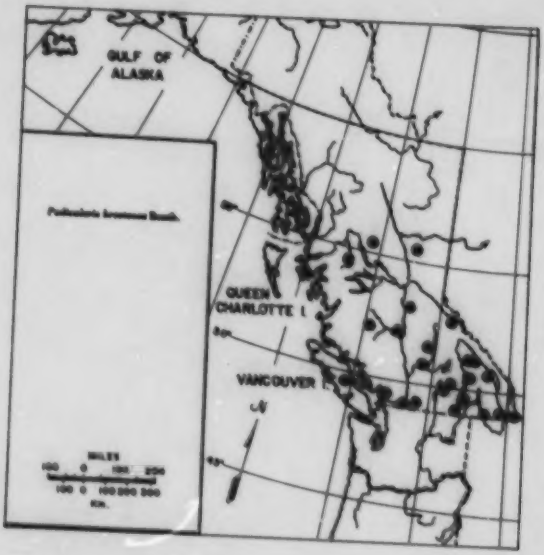
CRONQUIST, A. Plants of the Pacific Northwest, part 4. 1959.

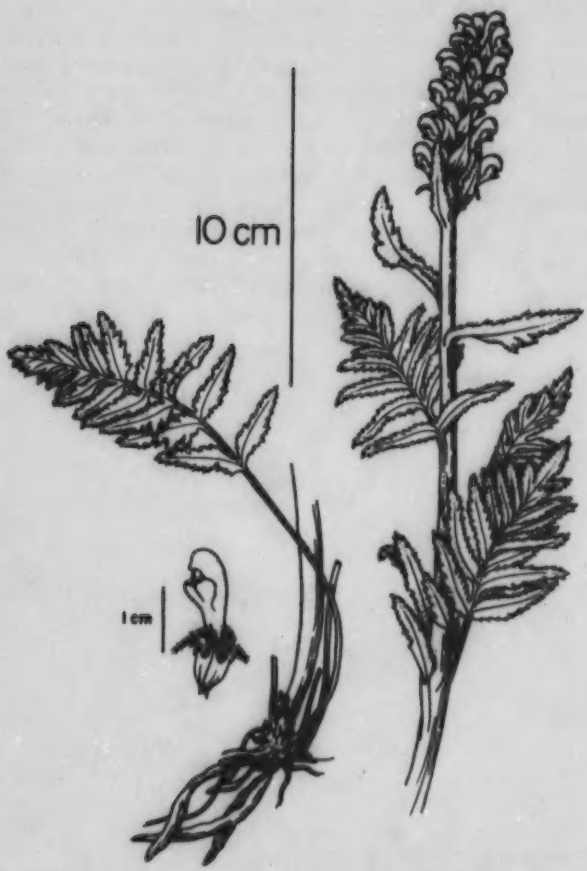
1. Cauline leaves verticillate; plant more or less pubescent; lobes of leaves broad, oblong, coarsely dentate ..... *P. verticillata*
1. Cauline leaves alternate or lacking.
   2. Leaves merely toothed; calyx lobes 2 ..... *P. racemosa*
   2. Leaves, or many of them, pinnatilobed to 2-pinnatifid; calyx lobes 3 (except in *P parviflora*).
      3. Stem branched; plants short-lived, perhaps annual; galea essentially beakless ..... *P. parviflora*
      3. Stem simple; plants perennial; galea beaked or beakless.
         4. Plants leafy-stemmed, basal leaves, if present, not markedly larger than the cauline; bracts sharply differentiated from the leaves; galea beakless or with a very short beak *P. bracteosa*
         4. Plants with leaves mostly basal, the cauline usually few and more or less reduced.
            5. Galea essentially beakless, sometimes with an inconspicuous point not more than 1 mm long.
               6. Corolla yellow or yellowish-white, sometimes faintly tinged with pink or purple.
                  7. Galea with long slender teeth at the tip .... *P. labradorica*
                  7. Galea lacking teeth at the tip.
                     Pinnæ of the leaves, or many of them, strongly incised; galea much longer than the corolla tube ..... *P. capitata*
                     Pinnæ mostly merely toothed; galea a little shorter than the corolla tube ..... *P. sudetica*

6. Corolla pink to purple.
    8. Galea with long slender teeth at the tip.
        9. Corolla 10–14 mm long; galea straight ..... *P. parviflora*
        9. Corolla much larger; galea arched.
            Cauline leaves few and small, or none, stem appearing naked or nearly so; rachis narrow; leaves distinctly pinnatifid ..... *P. sudetica*
            Cauline leaves rather numerous and not much, if at all, reduced, the stem appearing strongly leafy; rachis relatively broad; leaves often only pinnatilobed ..... *P. langsdorfii*
    8. Galea lacking teeth at the tip ..... *P. kanei*
5. Galea evidently beaked, the beak 2 mm or more long.
    10. Beak straight, usually less than 4 mm long ..... *P. ornithorhynca*
    10. Beak strongly curved, frequently more than 4 mm long.
        Beak lunately downcurved, not much, if at all, exserted from the well-developed lower lip ..... *P. contorta*
        Beak strongly upcurved, the living flowers strongly suggestive of an elephant's head with upraised trunk ..... *P. groenlandica*

1. ***Pedicularis bracteosa*** **Benth.**—Perennial. Stems erect, up to 1 m tall, coarsely fibrous-rooted, herbage glabrous below the inflorescence, leafy. Leaves short-petiolate or sessile, pinnatifid, linear oblong to lanceolate, up to 7 cm long, more or less incised and again finely serrate, segments of upper leaves becoming smaller and confluent. Calyx lobes 5, the upper much the shortest, the others partly connate into 2 lateral segments. Corolla purple, red or yellow, 13–21 mm long, galea beakless or nearly so, about as long as the tube.

In a variety of moist habitats in the mountains; British Columbia and Alberta, south to northern California and Colorado. General in the southern half of British Columbia, rare on Vancouver Island.

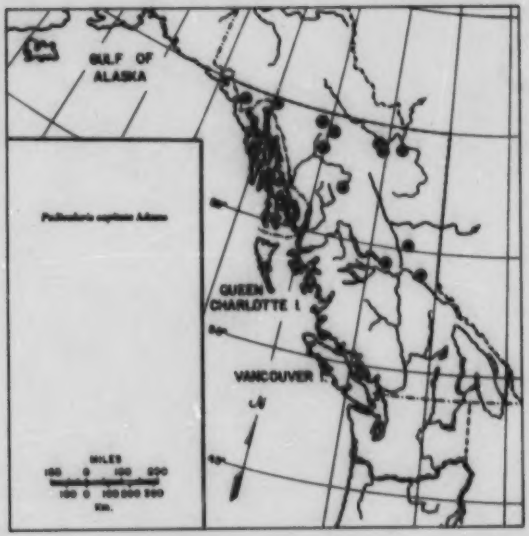




Bracted lousewort (*Pedicularis bracteosa*).

2. ***Pedicularis capitata*** **Adams**—Perennial. Stems up to 1.5 dm tall, from a creeping rhizome, more or less puberulent. Leaves mostly basal, the blade equalling or shorter than the petiole, the pinnate divisions, or many of them, sharply incised, the segments often again finely few-toothed, stem leaves, borne just below the inflorescence, 0–2, much reduced. Inflorescence capitate, puberulent or villous; bracts more or less foliose-serrate or -dissected, at least toward the tip, the lowest resembling leaves but sessile. Calyx lobes subequal, rather broad and leaf-like. Corolla yellowish-white, 2.5–3.5 cm long, galea much longer than the tube, lower lip up to 1.5 cm long.

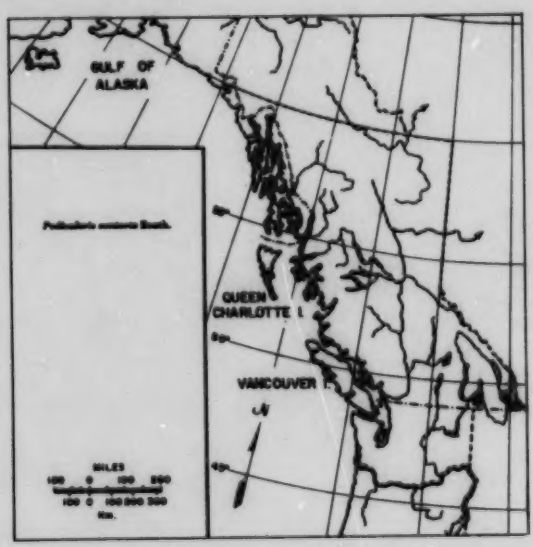
Arctic-alpine; found only in extreme northern British Columbia.



Capitate lousewort (*Pedicularis capitata*).

3. *Pedicularis contorta* Benth.—Perennial. Stems up to 6 dm, glabrous throughout, clustered from a stout rootstock. Leaves petiolate, blades equalling or longer than the petiole, pinnæ narrow, not crowded, serrate. Inflorescence elongate, rarely dense; bracts narrow, deeply 3-cleft. Calyx tube pale and somewhat papery between the 5 darker veins, lobes 5, narrow, entire, upper the shortest. Corolla yellowish-white or white, often finely marked with purple, about 1 cm long, galea short, strongly arched, attenuate into an elongate, lunately downcurved beak which is slightly, if at all, exserted from the well-developed lower lip.

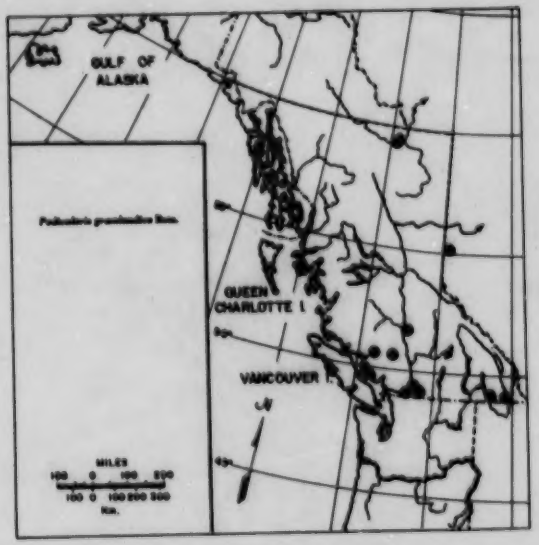
Wooded or dry open situations at moderate to high altitudes; British Columbia and Alberta, south to northern California, central Idaho and northern and western Wyoming. Known from southeastern British Columbia only.

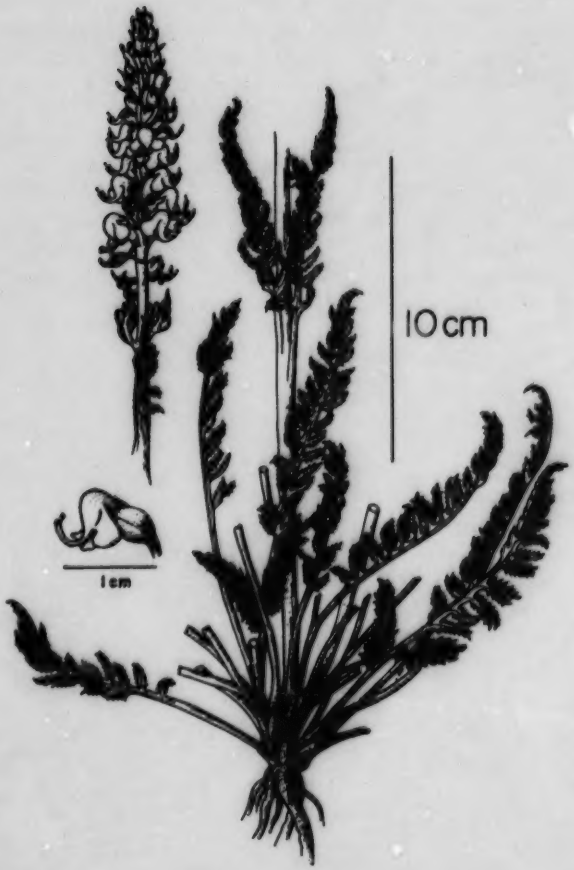


Coil-beaked lousewort (*Pedicularis contorta*).

4. ***Pedicularis groenlandica*** **Retz.**—Perennial. Stems up to 7 dm tall, often clustered, glabrous throughout. Basal leaves up to 25 cm long, blade equalling or exceeding the petiole, pinnæ narrow, sharply serrate, stem leaves several, progressively reduced upward. Inflorescence elongate, rather dense; bracts usually much shorter than the flowers, at least the lower more or less cleft into narrow segments. Calyx lobes 5, subequal, short, entire. Corolla pink-purple or almost red, 1.0–1.5 cm long, galea short, strongly hooded, tipped with a slender, elongate, conspicuously upturned beak, lower lip rather small.

Marshes, boggy meadows, edges of mountain streams; southern Alaska to Labrador, south, in the mountains, to California and New Mexico. General, throughout the Interior, but apparently absent from the Coast.

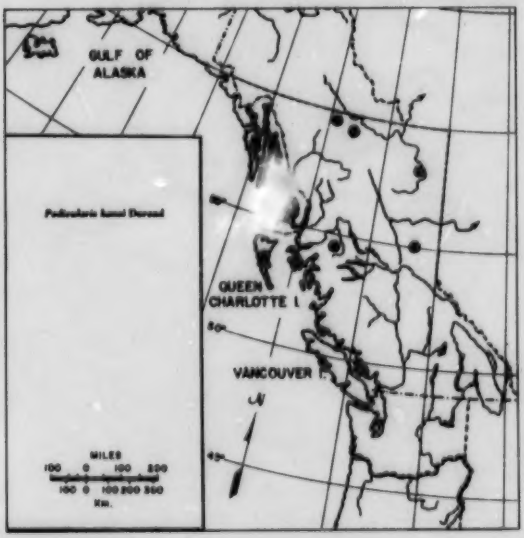


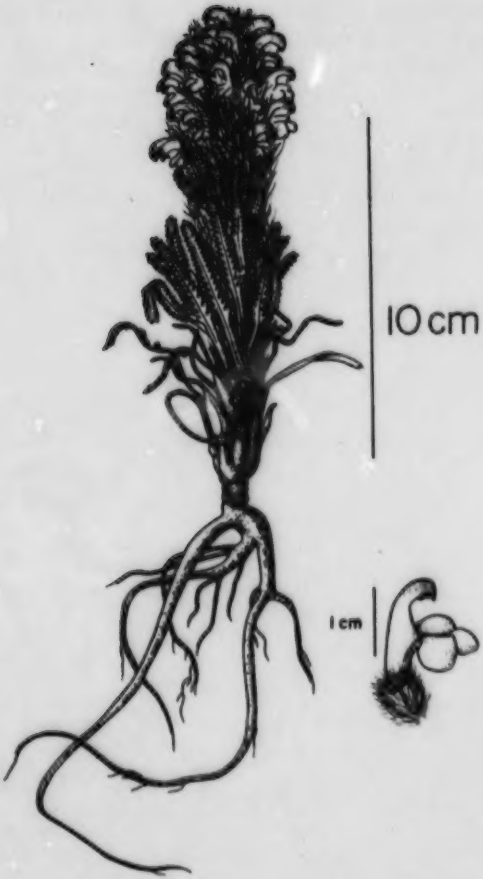


Elephant's-head (*Pedicularis grœnlandica*).

5. *Pedicularis kanei* Durand—Perennial. Stem simple, mostly single from a thick, yellow taproot, woolly above, with the brown remains of leaf bases below. Basal leaves numerous, linear-lanceolate, pinnately parted into many narrow, remote, pinnate to crenate-serrate segments. Inflorescence dense, oblong, white-woolly; lower bracts longer than the flowers. Calyx with triangular, acute teeth. Corolla rose-coloured, glabrous; galea and tube straight, lacking teeth; lower lip about as long as the upper, 3-lobed. Capsule ovate with acute beak (*P. lanata* Am. Auth.).

Dry, stony tundra; arctic-alpine, only north of Lat. 55°N.

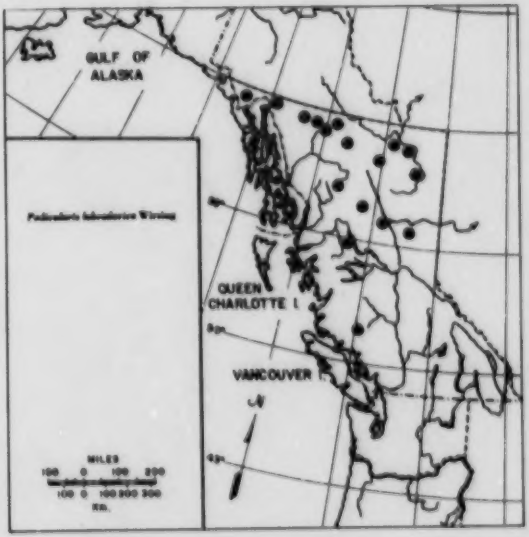


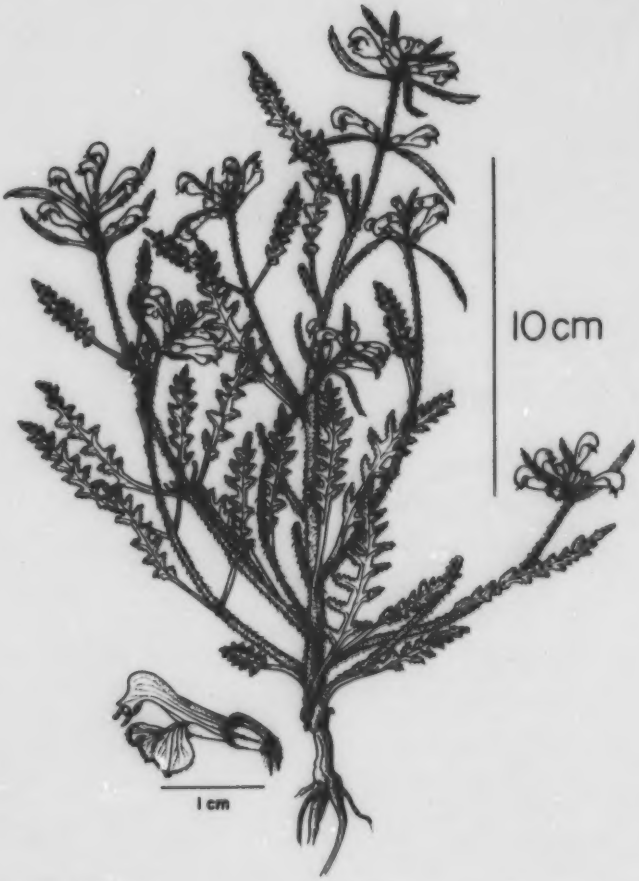


Kane's lousewort (*Pedicularis kanei*).

6. ***Pedicularis labradorica*** **Wirsing**—Perennial. Stems single or several, simple but frequently much branched, with retrorse, white hairs. Basal leaves small, lower stem leaves pinnatifid, lobes crenate, the upper gradually reduced. Calyx 2-cleft, glabrous or somewhat pubescent at base. Corolla yellow or reddish, or yellow with red spots above; tube straight; upper lip with a pair of long teeth, the lower 3-lobed, minutely ciliated. Capsule horizontal, oblong-linear, acute.

Tundra; arctic-alpine, Alaska to Labrador and Greenland. In British Columbia south to about Lat. 53°N.

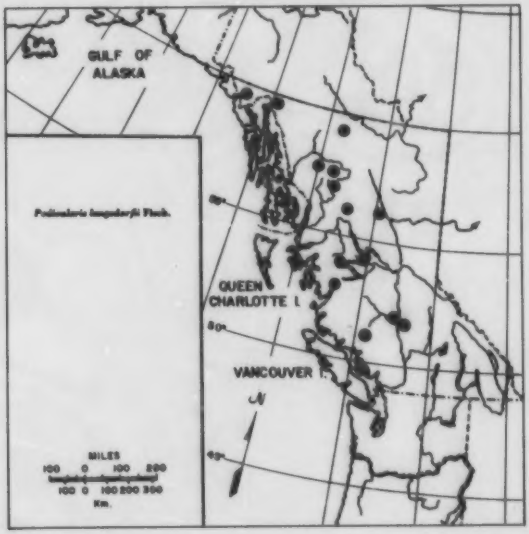


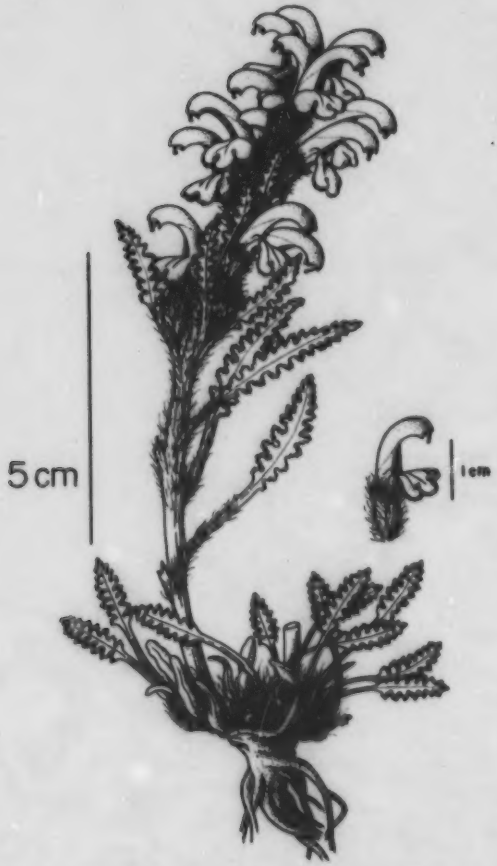


Labrador lousewort (*Pedicularis labradorica*).

7. ***Pedicularis langsdorfii*** **Fisch.**—Perennial. Stem solitary or several, up to 3 dm tall, arising from a stout rootstock, more or less woolly-villous, particularly above. Leaves 4–7 cm long, blade longer than the broad petiole, subpinnatified, lobes more or less toothed, rachis relatively broad, stem leaves quite numerous and not much smaller than the basal ones. Inflorescent elongate, often longer than the vegetative portion of the stem; lower bracts much surpassing the flowers, the upper gradually reduced. Calyx 5-lobed, the lateral lobes partly connate into 2 pairs. Corolla purple, 2.0–2.5 cm long, galea about equalling the tube, beakless, bearing a pair of slender, divergent teeth near the tip, lower lip well developed.

Arctic-alpine, tundra and alpine slopes; Siberia and arctic North America. South in mountains of British Columbia to about Lat. 53°N.

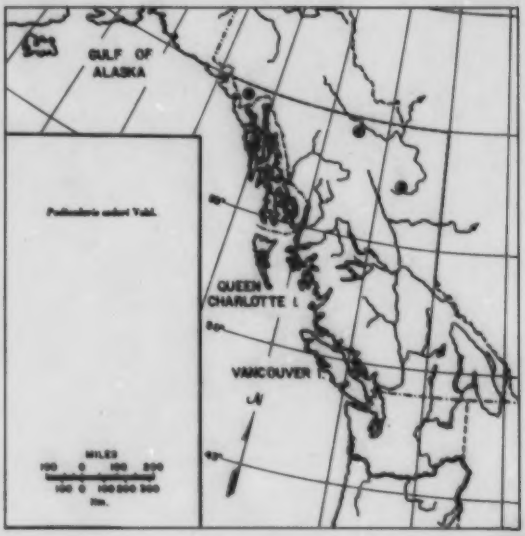




Langsdorf's lousewort (*Pedicularis langsdorfii*).

8. ***Pedicularis oederi*** **Vahl.**—Perennial. Stem to 2 dm tall, villous-puberulent, at least in the inflorescence. Leaves mostly basal, blade from a little shorter to clearly longer than the petiole, pinnæ rather broad and crowded, spreading or retrorse, markedly toothed, stem leaves few and reduced. Inflorescence spicate-racemose; bracts, particularly the lower ones, leaflike and toothed toward the tip. Calyx 5-lobed, lobes tending to become broader and coarsely few-toothed toward the tip. Corolla light yellow, 1.5–2.5 cm long; galea little shorter than the tube, beakless and without apical teeth.

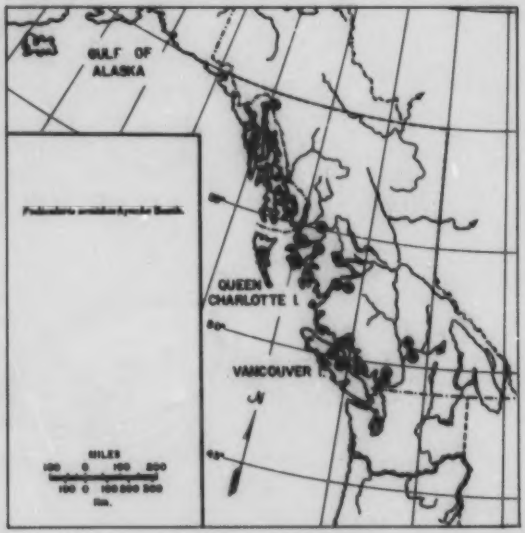
Arctic-alpine, tundra and alpine slopes; circumboreal, south in the Rocky Mountains to Wyoming. Rare in British Columbia except in the extreme north.

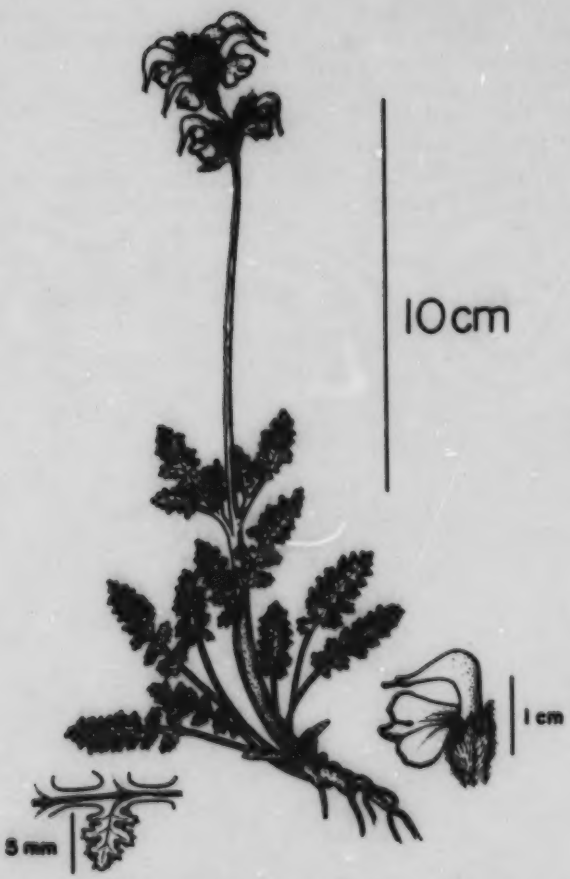


Oeder's lousewort (*Pedicularis oederi*).

9. *Pedicularis ornithorhyncha* Benth.—Perennial. Stem up to 3 dm tall, glabrous up to the inflorescence. Leaves mostly basal, blade exceeding or about equal to the petiole, narrow pinnæ deeply cleft and often again toothed, stem leaves few and poorly developed, sometimes wanting. Inflorescence capitate, sometimes with 1–2 smaller, lower, clusters of flowers; more or less villous bracts somewhat dissected. Calyx lobes 5, subequal, rather short. Corolla purple, mostly 1.0–1.5 cm long; galea produced into a distinct, straight, spreading beak, 2–4 mm long.

Meadows and slopes in alpine and subalpine regions; southern Alaska to central Washington. General in the Province.

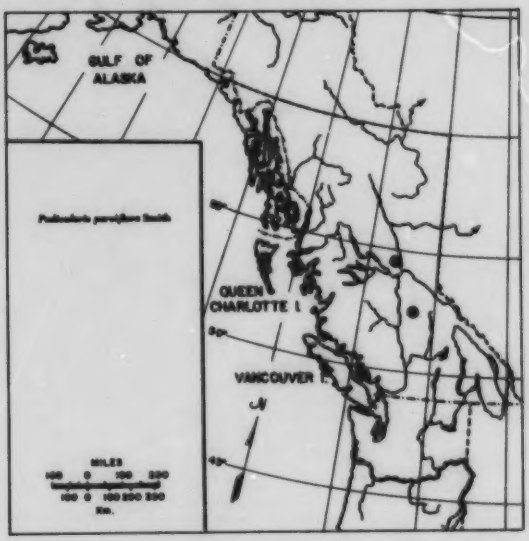




Bird's-beak lousewort (*Pedicularis ornithorhyncha*).

10. *Pedicularis parviflora* Smith—Short-lived, perhaps annual. Stem solitary, branching, up to 4 dm tall, glabrous up to the inflorescence. Leaves chiefly cauline, as much as 5 cm long, pinnatifid with entire or toothed, narrow segments. Flowers capitately clustered at the ends of branches, or the inflorescence often more elongate with the lower flowers remote and axillary; bracts foliose-dissected. Calyx 2-cleft with irregularly lacerate or lobed segments. Corolla slender, 11–14 mm long, purple, at least the galea which is shorter than the tube, beakless and usually lacking subapical teeth (including *P. pennellii* Hult.).

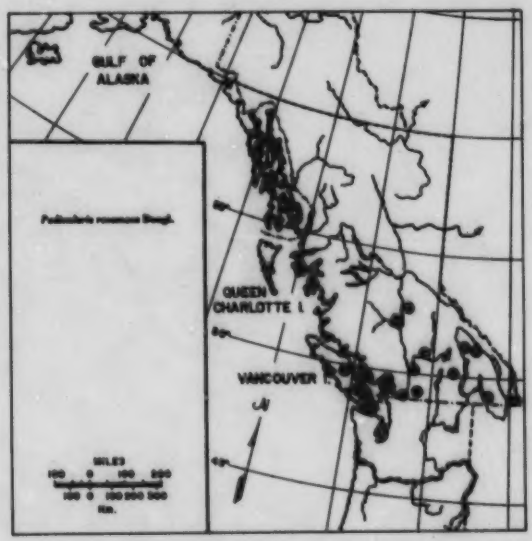
Mostly in muskeg; boreal, Alaska to Hudson Bay, south to central British Columbia. Collected at Bowron Lake, Prince George, and Queen Charlotte Islands.



Small-flowered lousewort (*Pedicularis parviflora*).

11. *Pedicularis racemosa* Dougl.—Perennial from a woody rootstock. Stems clustered, up to 5 dm tall, glabrous throughout or obscurely hairy above. Lowermost leaves much reduced, the others well distributed along the stem, short-petiolate or subsessile, lanceolate or lance-elliptic to lance-linear or linear-oblong, up to 10 cm long, doubly serrate. Inflorescence mostly lax and elongate, the lower flowers often axillary to scarcely altered leaves, the middle and upper bracts progressively smaller and less leafy. Calyx deeply cleft below, less so above, into 2 oblique, broad-based segments. Corolla pink to purplish or white to yellowish-white, 1.0–1.5 cm. long; galea strongly arched, tapered into a slender downcurved beak which more or less touches the prominent lower lip.

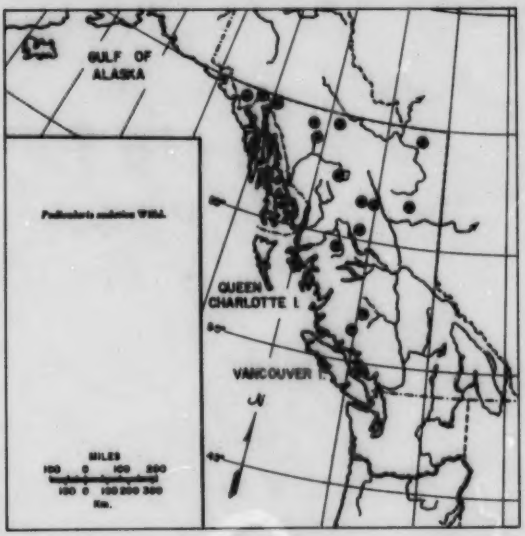
Mostly in coniferous woods at moderate elevations, sometimes in the open; British Columbia and Alberta, south to central California and New Mexico. General throughout the Province.

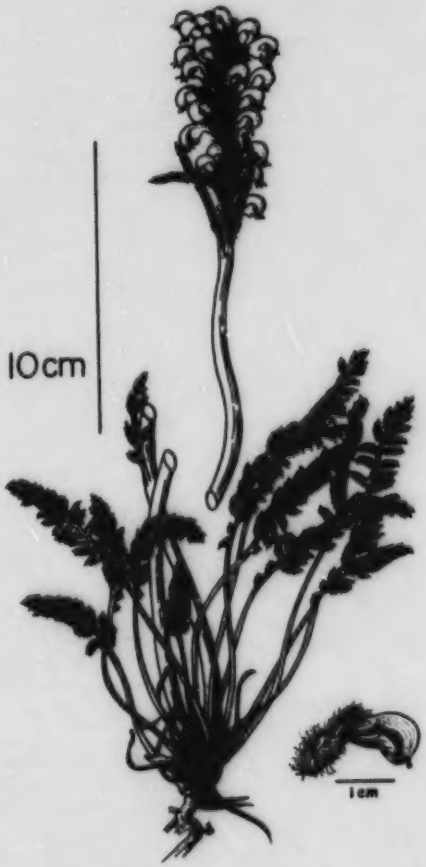


Sickle-top lousewort (*Pedicularis racemosa*).

12. *Pedicularis sudetica* Willd.—Perennial. Stems scapose, single or clustered from a stout fusiform rootstock, glabrous, dark purple. Basal leaves glabrous, long-petioled, with broad rachis, pinnatifid to pinnate, segments pinnatifid to dentate; stem leaves single or lacking, short-petioled. Inflorescence white woolly, at first capitate, later elongating; lower bracts not dilated at base, lacking long lobes, middle bracts entire. Calyx teeth triangular. Corolla dark reddish-purple; galea somewhat longer than the tube with 2 prominent teeth near the apex, lower lip 3-lobed; filaments glabrous. Capsule oblong, abruptly contracted into a short beak.

Rather wet calcareous tundra, lake shores; arctic-alpine, circumpolar. In British Columbia south to about Lat. 54°N.

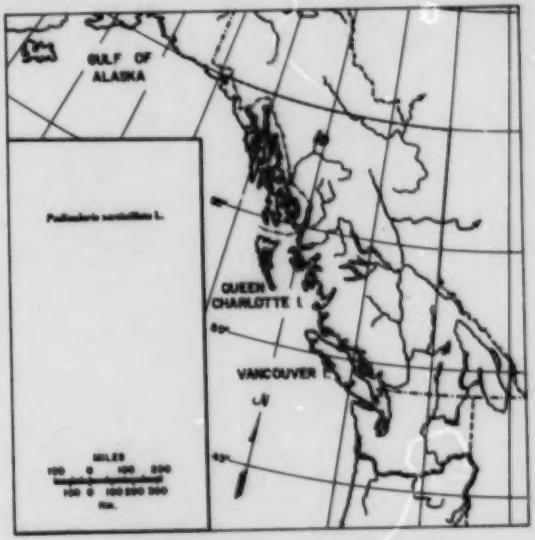


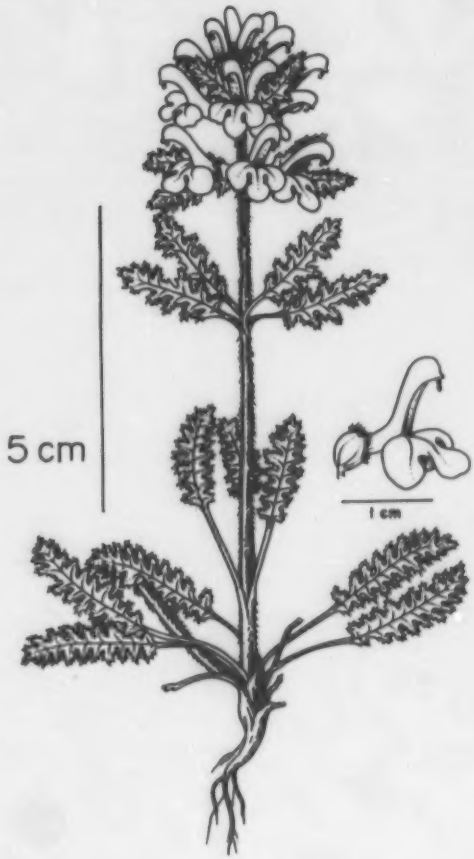


Sudeten lousewort (*Pedicularis sudetica*).

13. ***Pedicularis verticillata*** **L.**—Perennial. Stems erect to 20 cm, single or several, glabrous to crisp-hairy. Basal leaves with long, sparsely hairy petioles, lanceolate, pinnatifid, segments crenate, ovate; stem leaves in whorls of 2–4, similar to the basal but with shorter petioles or sessile. Flowers in whorls, the lower remote. Bracts lanceolate, often purplish, the upper shorter than the flowers. Calyx often purplish, teeth short, triangular, acute, entire. Corolla purplish-red, glabrous, tube twice as long as the calyx, galea almost straight, lacking teeth; lower lip 3-cleft, the lobes rounded, somewhat longer than the galea. Capsule narrowly ovoid, apiculate, almost twice as long as the calyx, often bent to one side.

Tundra, mountain meadows or rocky slopes; arctic-alpine, Eurasia; Alaska, Yukon, and northern British Columbia. Known from the Queen Charlotte Islands and extreme northern British Columbia.





Verticillate lousewort (*Pedicularis verticillata*).

PENSTEMON Mitch. Beard-tongue, Penstemon

Perennial herbs or shrubs. Leaves opposite, rarely ternate or the upper alternate, the lower petiolate, the upper sessile. Flowers showy, in racemose, thyrsoid, or cymose panicles. Calyx 5-parted. Corolla tubular, the tube often ampliate, the limb from nearly regular to strongly 2-lipped, the upper lip 2-lobed, the lower 3-cleft. Fertile stamens 4, paired, with arching filaments, a fifth represented by a long, sterile filament (staminode); anthers 2-celled, the cells frequently confluent. Capsule cartilaginous. Seeds numerous.

A North American genus of well over 200 species, most numerous in western United States; one species in Kamtschatka and northern Japan.

KECK, D. D. Studies in Penstemon. I. A systematic study of the section Saccanthera. U. Cal. Publ. Bot. **16**:367–426. 1932.

——— Studies in Penstemon. VI. The section Aurator. BULL. Torrey Bot. Club. **65**:233–255. 1938.

——— Studies in Penstemon. VII. The sub sections Gairdneriani, Deusti, and Arenarii of the Graciles, and miscellaneous new species. Am. Midland Nat. **23**:594–616. 1940.

——— Studies in Penstemon. VII. A cyto-taxonomic account of the section Spermunculus. Am. Midland Nat. **33**:128–206. 1945.

——— and A. CRONQUIST. Studies in Penstemon. IX. Brittonia **8**:247–250. 1957.

Adapted from Cronquist in Vascular Plants of the Pacific Northwest, Part 4. 1959.

1. Anthers more or less densely long-woolly with tangled hairs (conspicuously so to the naked eye).
   2. Plants 3–8 dm tall, herbaceous nearly or quite to the base; some or all of the axillary peduncles generally branched and 2- to several-flowered; inflorescence thus more or less paniculate; leaves all cauline, the lower reduced, the better developed often more than 6 cm long, or more than 2.5 cm wide, or both.

Leaves distinctly short-petiolate, rather thin and sharply serrate, mostly 1.5–4.0 cm wide; corolla glandular-hairy externally, glabrous internally; staminode bearded; Cascade region and westward ..... *P. nemerosus*

Leaves sessile or merely narrowed to an obscurely subpetiolar base, thicker and less toothed, commonly remotely serrulate to subentire, mostly 3–10 mm wide; corolla glabrous externally, densely woolly-villous along the two prominent ventral ridges internally; staminode glabrous; east of the Cascades ..... *P. lyallii*

2. Plants 0.5–4.0 dm tall, usually more or less distinctly woody toward the base; axillary peduncles generally all simple and 1-flowered, inflorescence thus essentially racemose; leaves not over 6 cm long and 2.5 cm wide, often basal or near basal as well as cauline.

3. Plants forming dense mats, with scattered, simple, and mostly erect flowering stems not more than about 1.5 dm tall; leaf blades 1–2.5 times as long as wide.

Leaves of the erect flowering stems relatively well developed, rarely less than 1 cm long; calyx 8–15 mm long, segments lance-linear to linear-oblong, conspicuously glandular-hairy; leaves glabrous, not or scarcely, glaucous, finely and often irregularly serrulate, rarely quite entire; Rocky Mountain region ..... *P. ellipticus*

Leaves of the erect flowering stems small and often bract-like, rarely as much as 1 cm long; other characters diverse, but not combined as in *P. ellipticus;* Cascades region and westward ..... *P. davidsonii*

3. Plants more or less ascending or erect, branched above the ground surface, the cluster of leaves at the base of the season's growth more or less elevated above the ground, not forming mats; plants often well over 1.5 dm tall; leaf blades 2–10 times as long as wide; east of Cascade summits ..... *P. fruticosus*

1. Anthers glabrous, or inconspicuously, hispidulous with short, mostly straight hairs.

4. Pollen sacs opening across their confluent apices, the free tips remaining saccate and indehiscent, not becoming divaricate, the anthers more or less permanently horseshoe-shaped.

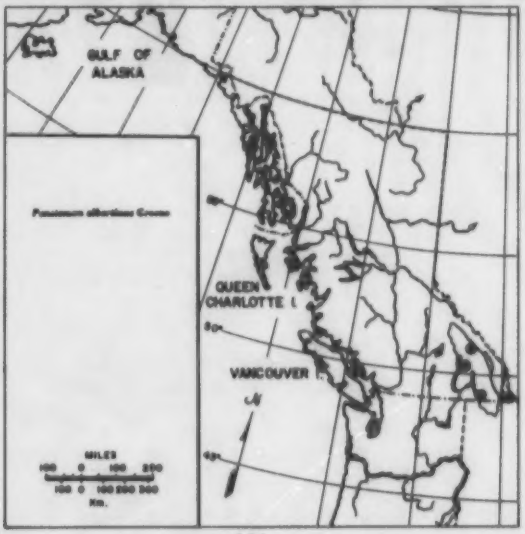
Plants not at all glandular; leaves evidently toothed or rarely subentire; corolla 17–25 mm long, deep blue to dark purple; Cascades region and westward ..... *P. serrulatus*

Plants evidently glandular in the inflorescence; leaves sharply serrate-dentate to irregularly laciniate-pinnatifid; corolla 22–32 mm long, bright lavender; east of Cascade summits ..... *P. richardsonii*

4. Pollen sacs opening throughout their length, or remaining indehiscent at their apex, almost always becoming divaricate (or even opposite) after dehiscence.
   5. Plants not glandular; leaves entire or nearly so.
      6. Seeds about 3 mm and capsules 7–12 mm long; corolla bright blue, 13–18 mm long; palate glabrous; caudex compactly branched, not creeping, often surmounting a short taproot ..... *P. nitidus*
      6. Seeds 0.5–1.5 mm and capsules 3–7 mm long; corolla 6–16 mm long; palate bearded; caudex somewhat rhizomelike, tending to creep along the surface of the ground.
         Flowers blue or purple, whitish-yellow in some forms; bracts of the inflorescence with entire not evidently scarious margins ..... *P. procerus*
         Flowers whitish-yellow or light yellowish to brownish; bracts of the inflorescence, or many of them, evidently scarious margined and erose ..... *P. confertus*
   5. Plants more or less glandular in the inflorescence (or on the corollas) or occasionally essentially glabrous in forms of some species that have generally more or less toothed leaves.
      7. Ovary and capsule ordinarily glandular-puberulent near the summit; calyx 7–13 mm long, segments herbaceous and entire; corolla 20–40 mm long; staminode more or less exserted from the mouth of the corolla; widespread east of the Cascade Mountains ..... *P. eriantherus*
      7. Ovary and capsule ordinarily glabrous; calyx seldom over 7(8) mm long; corolla shorter, or narrower, or both.
         8. Stems arising singly or few together from a short, subterranean caudex; corollas pale lilac or pale violet, whitish within; plains species, east of the Rocky Mountains ..... *P. gracilis*
         8. Stems arising from a more or less superficial, branched caudex; cordilleran or west arctic species.
            9. Leaves all entire or nearly so.
               Calyx 9–10 mm long, acuminate; corolla 18–25 mm long; capsule 0–10 mm long; staminode bearded for more than half its length; arctic species ..... *P. gormanii*
               Calyx 4–7 mm long, lanceolate with narrow scarious margins; corolla averaging shorter; capsules 6–8 mm long long; staminode only bearded at its expanded tip; cordilleran species ..... *P. attenuatus*
            9. Leaves, or many of them, more or less evidently toothed.
               10. Corollas relatively small, mostly 11–16 mm long; south central British Columbia only ..... *P. pruinosus*

10. Corollas larger, mostly 15–23 mm long; plants of either more eastern or western distribution.
    Plants relatively robust, 4–10 dm tall; leaves sharply toothed, mostly relatively broad; the larger cauline ones usually more than 1.5 cm broad; species from west of the Cascade Mountains ..... *P. ovatus*
    Plants smaller, commonly less than 4 dm tall; leaves narrow, rather irregularly and obscurely few-toothed; species of southeastern British Columbia ..... *P. albertinus*

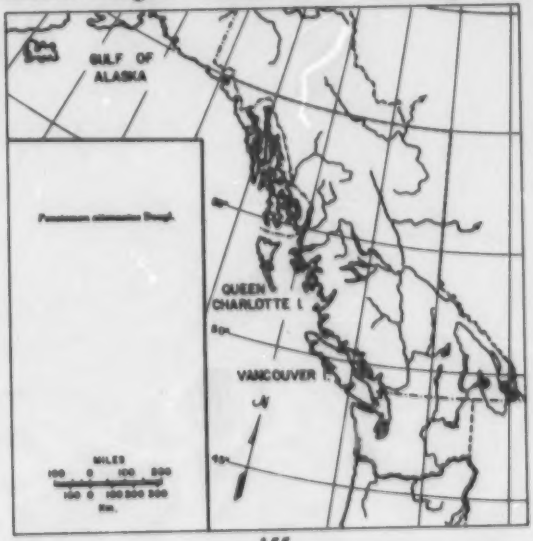
1. ***Penstemon albertinus*** **Greene**—Stems clustered, more or less puberulent at least toward the base or glabrous, rarely somewhat glandular throughout, up to 4 dm tall. Leaves bright green, mostly glabrous, obscurely but sharply serrate-denticulate or wholly entire, basal lanceolate to oval, 4–10 cm long, petiole 1–2 times length of blade, cauline lance-oblong. Inflorescence narrowly paniculate, often leafy-bracted, of 4–8 rather loose, many-flowered, distinct flower clusters. Calyx 3–5 mm long, lobes lance-oblong to



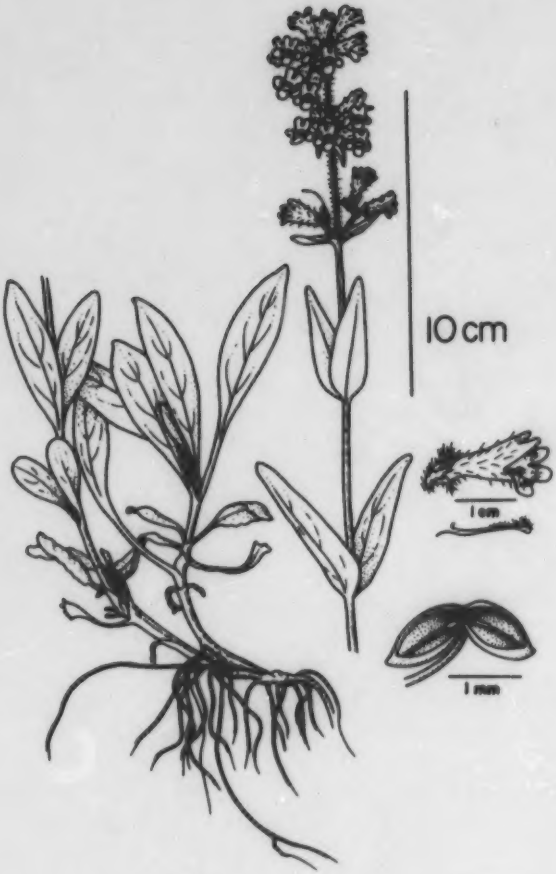
ovate, acute to acuminate, narrow scarious margin subentire. Corolla bright blue to blue violet, 13–20 mm long, lower lip exceeding the upper; another-sacs ovate, nearly explanate, denticulate-ciliate or glabrous, staminode reaching the orifice, golden-bearded at apex for half its length.

Gravelly slopes or rocky ridges; southeastern British Columbia and southwestern Alberta, south to western Montana and central Idaho. Southeastern British Columbia.

2. *Penstemon attenuatus* **Dougl.** — Stems tufted from a superficial rhizome-like caudex, mostly up to 7 dm tall, glabrous except in the glandular-pubescent inflorescence, or finely hirtellous-puberulent. Leaves dark green, entire or nearly so, the basal well developed, linear-lanceolate to oval, petiolate, as much as 17 cm long and 4 cm wide; the upper sessile, gradually or abruptly reduced. Inflorescence of 2-several, dense verticillasters. Calyx 4–7 mm long, the lobes lanceolate, or sometimes ovate or obovate, with erose, scarious margins. Corolla 14–20 mm long, varying from



Alberta penstemon (*Penstemon albertinus*).

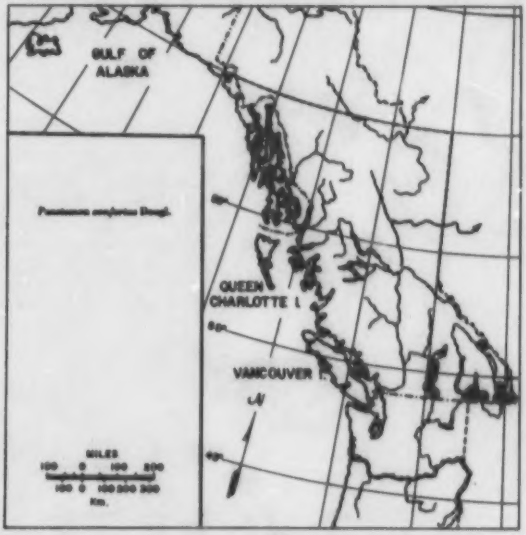


Taper-leaved penstemon (*Penstemon attenuatus*).

various shades of blue-purple to yellowish or almost white; palate moderately to amply bearded with whitish hairs. Staminode densely yellow bearded at its expanded tip. Capsule 6–8 mm long.

Pine woods, dry meadows, and open hillsides; southeastern British Columbia and northwestern Montana, south to north central Wyoming, central Washington, eastern Oregon, and southern Idaho. In British Columbia known only from the southeastern Kootenays.

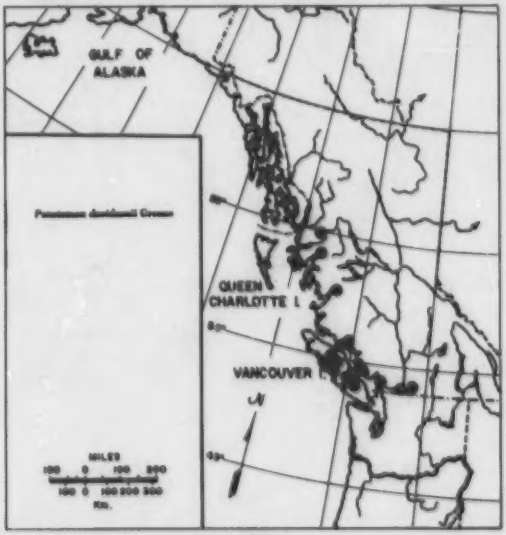
3. *Penstemon confertus* Dougl.—Stems slender, 2–5 dm tall; rosette well-developed; leaves bright green, thin, basal lanceolate to oblanceolate, 3–7 cm long, up to 20 mm wide, on short slender petioles, stem leaves narrow, often clasping. Inflorescence strict, of 2–7 dense flower clusters, the lower often well spaced and on appressed peduncles up to 5 cm long. Calyx 3–5 mm long, lobes lanceolate to broadly oblong, tip abruptly acuminate or subulate, much shorter than the body, very thin, scarious margin usually much wider than the green central portion, prominently erose.

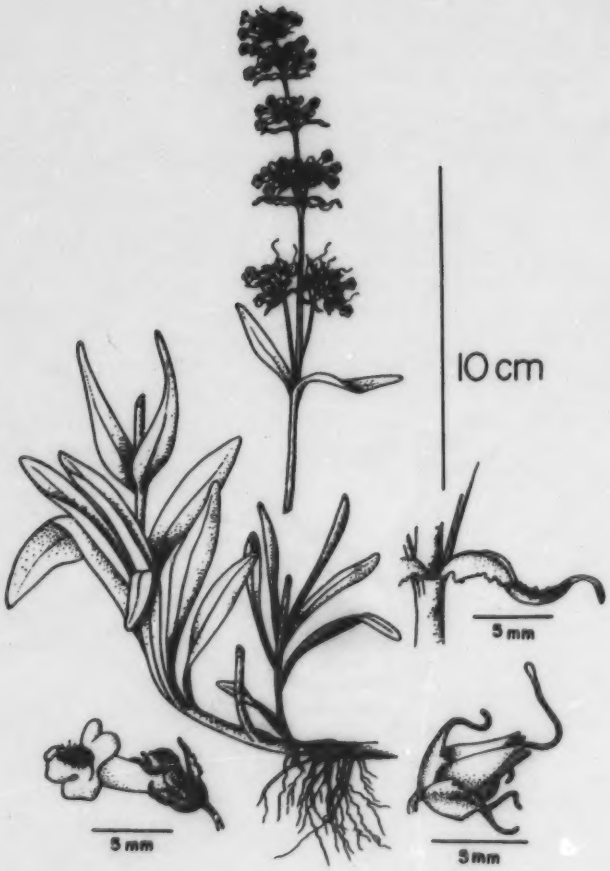


Corolla pale sulphur yellow, not obviously declined, about 9 mm long, narrowly tubular, 2-lipped, limb expanded, the ridged palate well-bearded with light-brown hairs; anthers-sacs oval, essentially explanate, staminode included, with short tuft of brownish hairs.

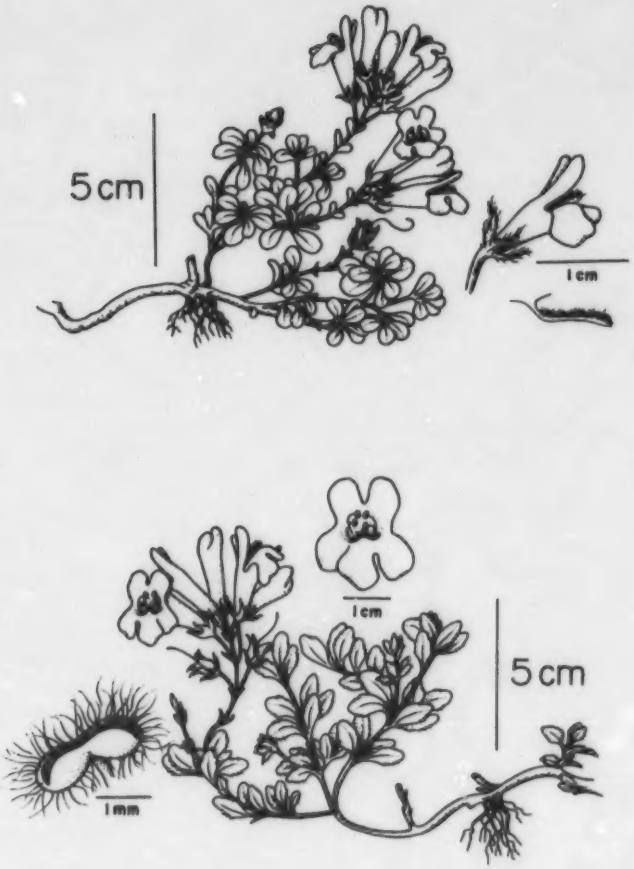
Grassy places and forest openings from low to mid-altitudes; southern British Columbia and western Alberta, south to central Oregon and western Montana. Found in the Okanagan Valley and eastward.

4. *Penstemon davidsonii* Greene—Stems suffruticose, forming creeping mats, no taproot evident, flowering stems less than 1 dm tall, puberulent. Leaves of the mat thick, more or less glandular-punctate, entire or serrulate, short-petioled, elliptic to orbicular, up to 1.5 cm long and up to 2.5 times as long as broad, tip rounded or sometimes acutish; leaves of flowering stems few and small. Racemes few-flowered; bracts, pedicels, and main axis somewhat glandular-hairy. Calyx mostly 7–11 mm long, lobes linear- to broadly-lanceolate, inconspicuously glandular-hairy or





Yellow penstemon (*Penstemon confertus*).

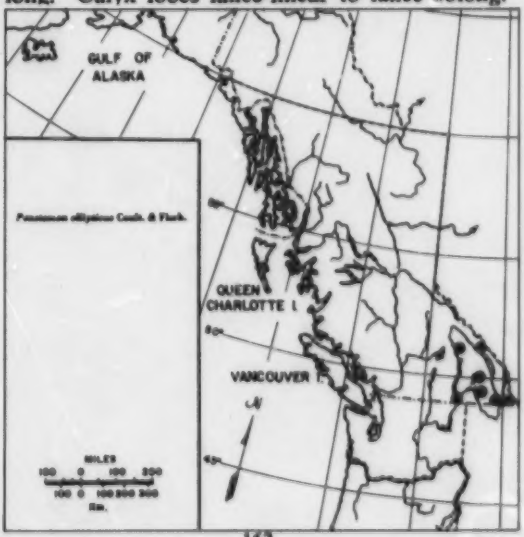


Davidson's penstemon (*Penstemon davidsonii*).

glabrous. Corolla blue-lavender to purple-violet, 25–35 mm long, throat moderately dilated, ventral ridges sparsely to rather densely villous, glabrous outside; stamens included, anthers densely long-woolly, explanate, staminode about half as long as the fertile stamens, long-bearded toward the tip (*P. menziesii* Hook.).

Rocky ledges and among rocks; southern British Columbia to California in the Cascade-Sierra region. General in the southern half of the Province west of the Coast Mountains.

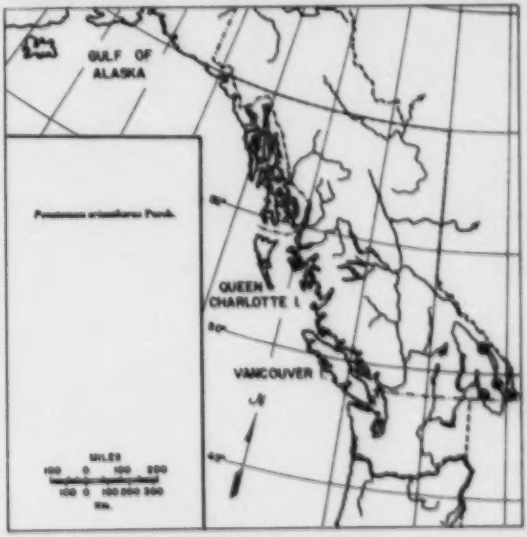
5. *Penstemon ellipticus* Coult. & Fischer—Stems suffruticase, procumbent, forming loose mats with scattered, spreading-hairy, erect, flowering stems up to 1.5 dm tall. Leaves glabrous, those of the mat short-petiolate, broadly elliptical, sometimes more ovate or obovate, inconspicuously serrulate or subentire, rounded or obtuse, up to 2.5 cm long and 16 mm wide; leaves of the flowering shoots subsessile, usually well developed, often fully as large as the mat leaves. Inflorescence a few-flowered raceme with 2–4 pairs of flowers on more or less strongly glandular penduncles up to 2.5 cm long. Calyx lobes lance-linear to lance-oblong. Corolla

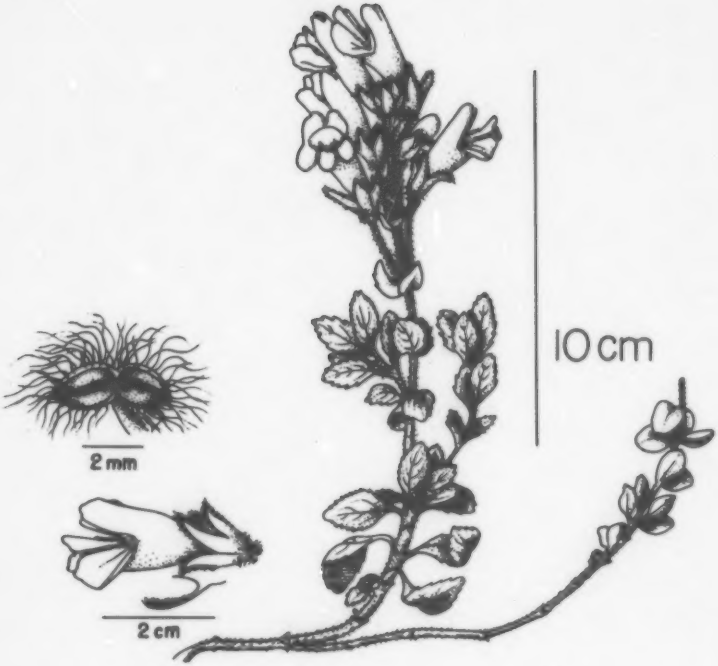


light-violet to deep lavender, 25–40 mm long, glabrous without, long white hairy near the base of the lower lip within, especially near the prominent ventral ridges; anthers densely white woolly, explanate, the staminode shorter than the fertile stamens, more or less long-bearded for much of its length.

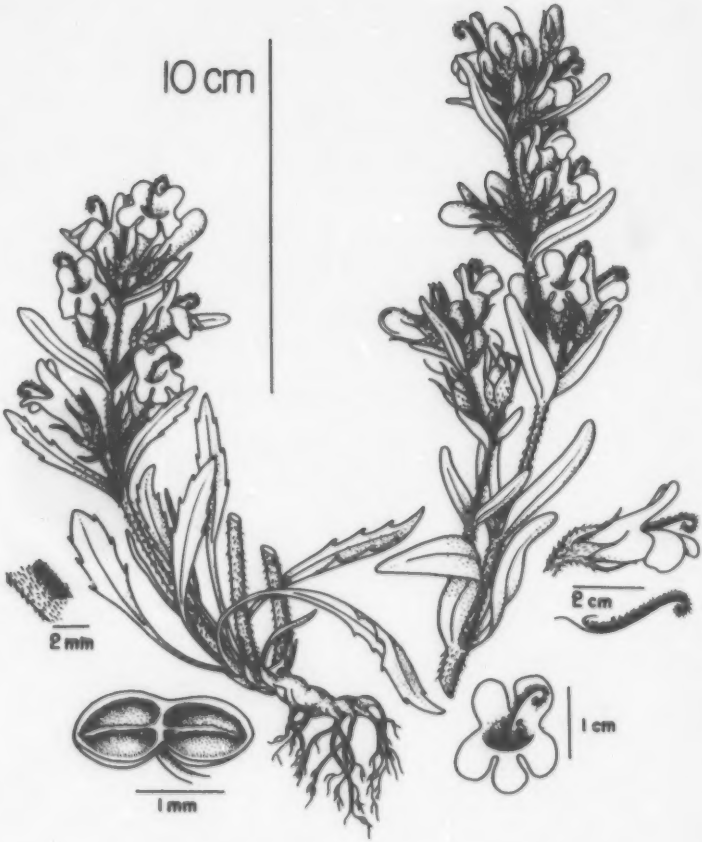
Rocky slopes and cliff faces in subalpine areas; southwestern Alberta and southeastern British Columbia, south to northern Idaho and northwestern Montana. In the Kootenay and Columbia Valleys.

6. *Penstemon eriantherus* Pursh—Stems up to 3 dm tall, villous to canescent. Leaves entire to saliently and remotely toothed, glandular-pubescent to canescent, basal lanceolate to ovate, upper lanceolate to oblong. Inflorescence of several approximate or distinct flower clusters. Calyx lobes acuminate, strongly viscid-pubescent. Corolla 20–35 mm long, light blue-magenta or purplish-violet, guide lines of deeper colour within, generally not glandular within, strongly pilose at base of lower lip; anther-sacs widely





Elliptic-leaved penstemon (*Penstemon ellipticus*).

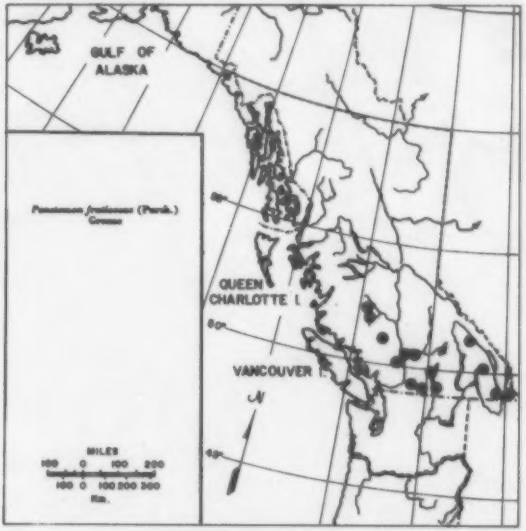


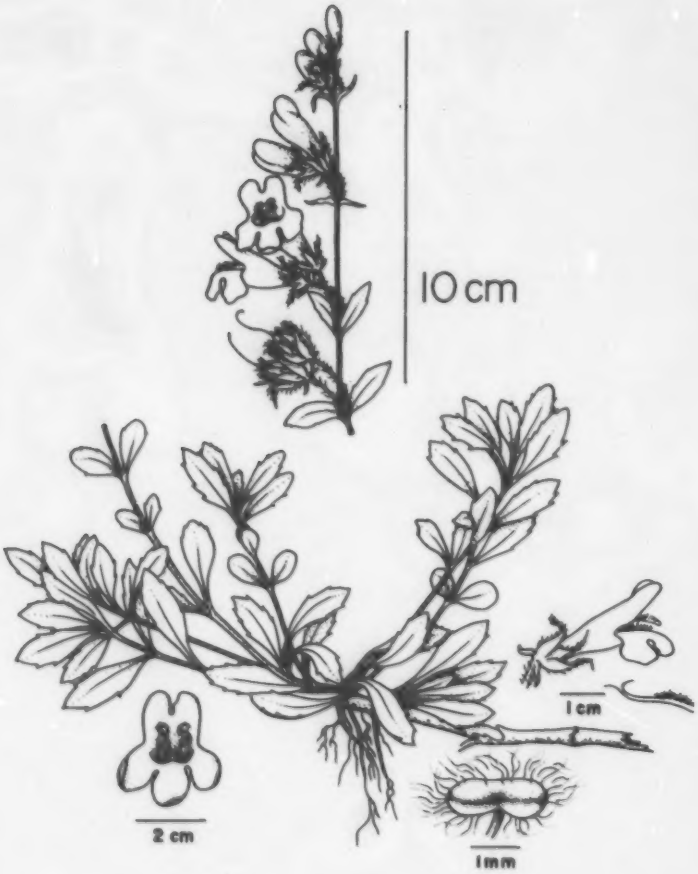
Fuzzy-tongued penstemon (*Penstemon eriantherus*).

divaricate, explanate or nearly so, staminode prominently exserted, strongly bearded through its length with long, yellow hairs.

Dry, open places up to moderate elevations; southeastern British Columbia to North Dakota and Nebraska, south to central Oregon and Colorado. From south Columbia Valley and eastward.

7. *Penstemon fruticosus* (Pursh) Greene—Shrubs or subshrubs, ascending or erect, freely branched, up to 4 dm tall, essentially glabrous but glandular-hairy in the inflorescence, or the stems of the current season often finely puberulent or strigose-puberulent. Leaves of sterile shoots short-petiolate, the entire or toothed blade up to 6 cm long, leaves of flowering shoots more or less reduced and less crowded. Inflorescence, a short, few-flowered, bracteate raceme, with simple axillary pedicels. Calyx 7–15 mm long, segments lance-linear to lance-ovate, long-acuminate. Corolla blue-lavender to light purplish, 30–50 mm long, keeled on the back, glabrous outside, long white-hairy near the base of the lower lip





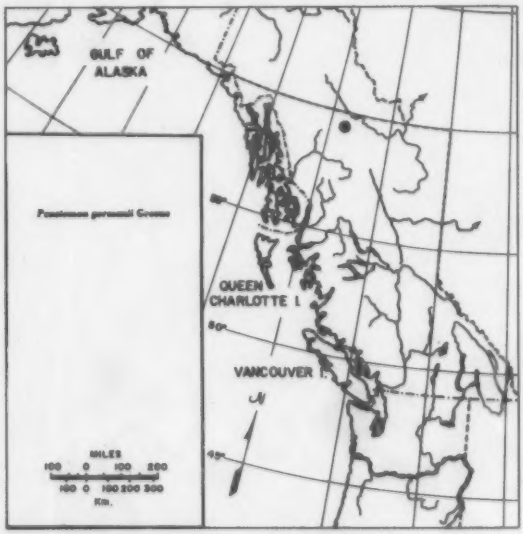
Shrubby penstemon (*Penstemon fruticosus*).

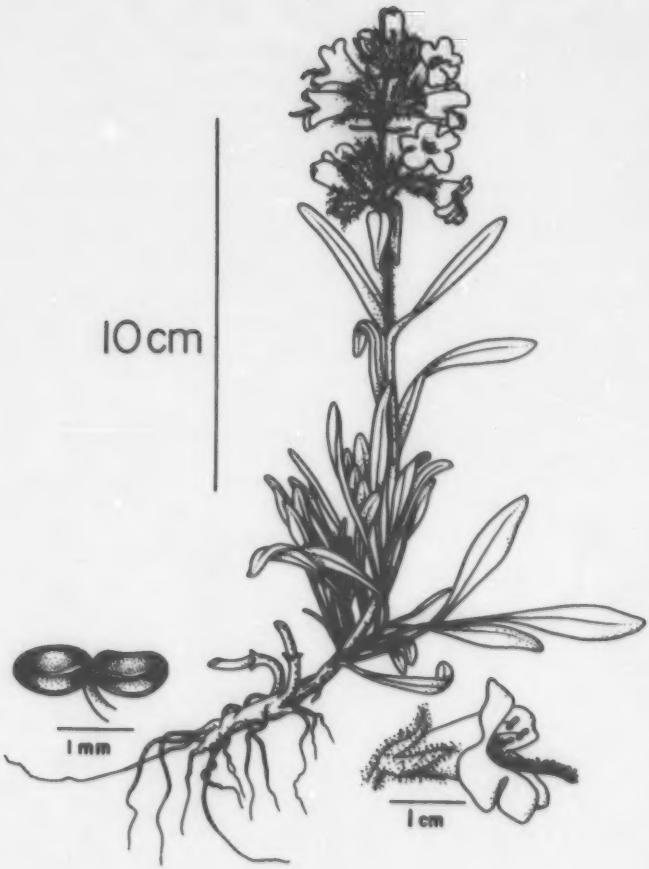
within; anthers densely long-woolly, staminode slender, shorter than the fertile filaments, long-bearded toward the tip (*P. scouleri* Lindl.).

Rocky, open places from low to quite high elevations; southern British Columbia, east to Montana, south to central Oregon and Wyoming. General across southern British Columbia.

8. *Penstemon gormanii* Greene — Stems several from a woody rootstock, upper part glandular-villous. Basal leaves spatulate-oblong, entire, glabrous, petiolate; stem leaves linear-oblong, sessile. Calyx densely pubescent, nearly 1 cm long, lobes attenuate. Corolla about twice as long, violet to purplish, lobes rounded, hirsute on the inside. Capsule elliptic, mucronate, about as long as the calyx.

Dry mountain slopes and rocky areas; Alaska, Yukon, and northern British Columbia. Known only from the Cassiar District.

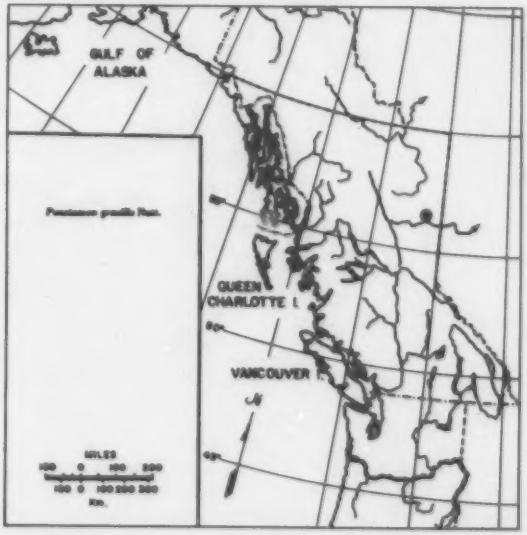


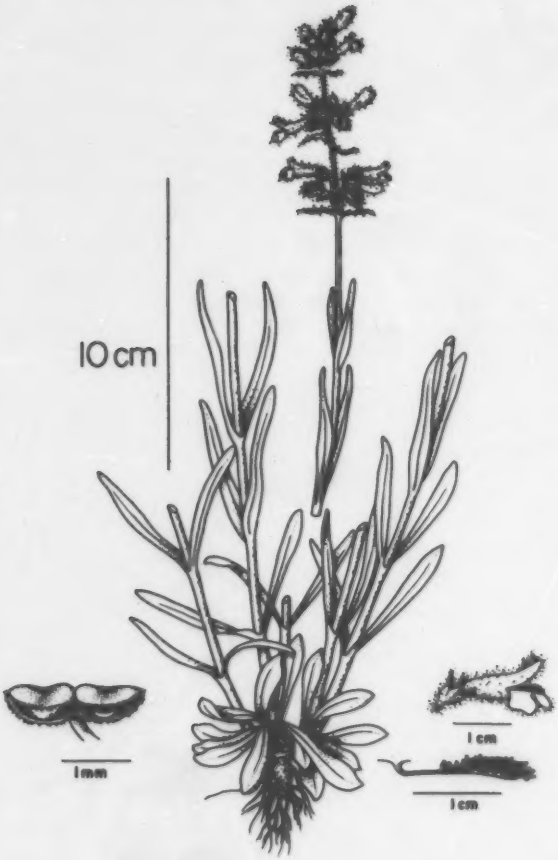


Gorman's penstemon (*Penstemon gormanii*).

9. *Penstemon gracilis* Nutt.—Stems slender, erect, up to 4 dm tall, glabrous or somewhat puberulent. Basal leaves short-petioled, many with scattered, short callous teeth, basal and lower cauline leaves mostly oblanceolate or elliptic, poorly developed or soon withering; stem leaves sessile, linear-lanceolate, mostly denticulate. Inflorescence slender, of several, few-flowered often approximate verticillasters; pedicles glandular-puberulent. Calyx 4–7 mm long, segments lanceolate to ovate, with or without scarious margins. Corolla slender, up to 22 mm long, lilac or whitish, glandular-hairy externally, guide-lines evident, palate bearded; anthers essentially glabrous, not explanate, staminode gradually expanded upward, conspicuously yellow-bearded for much of its length, generally slightly exserted.

Moist prairie grasslands, often in sandy or rocky soil; southern Alberta and northeastern British Columbia, south to New Mexico, east to northern Iowa, Wisconsin, and southwestern Ontario. Found only in the Peace River District.

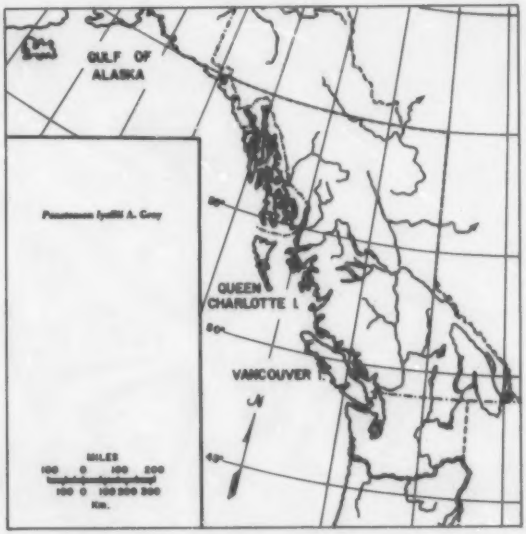


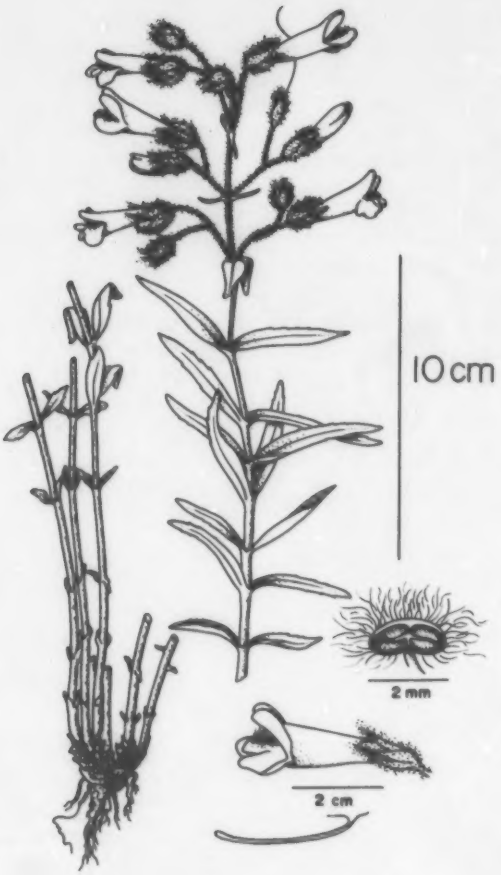


Slender penstemon (*Penstemon gracilis*).

10. *Penstemon lyallii* A. Gray—Stems usually in clumps from a woody rootstock, glabrous or puberulent, glandular-hair in the inflorescence. Leaves all cauline, the lower reduced, the others lanceolate or linear-lanceolate, attenuate, sharply denticulate to entire, glabrous or sometimes rough-puberulent. Inflorescence more or less paniculate, branched axillary peduncles 2- to several-flowered. Calyx up to 14 mm long, segments lanceolate; subherbaceous, entire. Corolla pale purple or light lavender, 3.0–4.5 cm long, glabrous externally, conspicuously woolly-villous along the prominent ventral ridges within, lower lip about same length as the upper; anthers densely long-woolly, explanate, filaments and staminode glabrous, staminode mostly shorter than the fertile stamens.

Open rocky slopes, shale slides, gravel bars along streams; southwestern Alberta and southeastern British Columbia, south to northern Montana and northern Idaho. Confined to the Crow's Nest area.

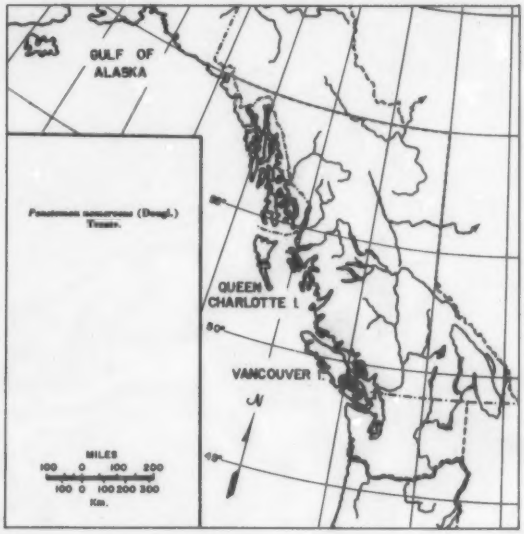


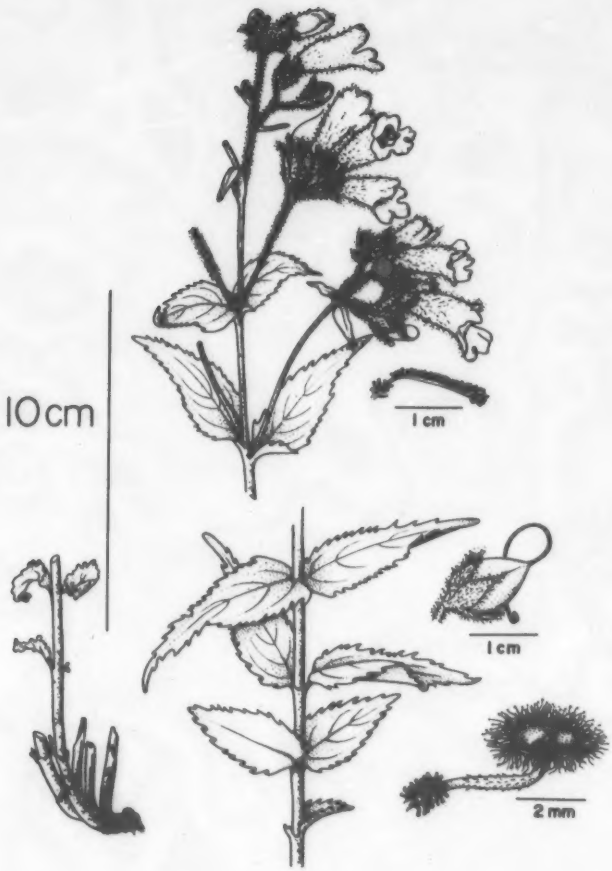


Lyall's penstemon (*Penstemon lyallii*).

11. ***Penstemon nemorosus*** **(Dougl.) Trautv.**—Stems few, erect, from an unbranched woody rootstock, up to 8 dm tall, puberulent, Leaves all cauline, thin, finely to coarsely serate, lanceolate to ovate, rounded to subcordate at base, mostly short-petioled, glabrous above, paler and somewhat puberulent beneath. Inflorescence glandular-pubescent, loosely few-flowered. Calyx about 10 mm long, segments ovate or lanceolate, not scarious-margined. Corolla bluish-purple, glandular-pubescent externally, 3 cm long, distinctly 2-lipped, throat dilated, upper lip shorter with very short lobes, middle lobe of the lower lip longer than the lateral. Anthers densely long-woolly, becoming explanate, filaments puberulent, long-hairy at the base, staminode much shorter than the fertile stamens, bearded throughout its length.

Woods and moist rocky slopes at mid-altitudes in the Cascades; southern Vancouver Island to northern California, west of the Cascades. Known only from Vancouver Island.

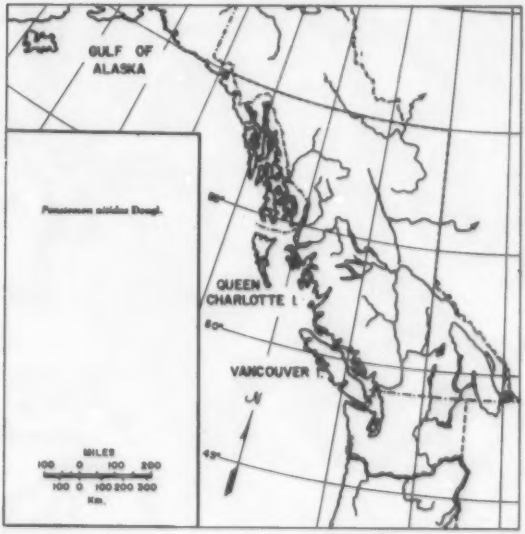




Woodland beardstongue (*Penstemon nemorosus*).

12. *Penstemon nitidus* Dougl.—Stems stout, up to 3 dm tall, often in clumps, glabrous. Leaves ovate-lanceolate or oblanceolate, 3.5 cm long, thick, entire, glabrous, glaucous. Inflorescence paniculate, bracts large, ovate or lanceolate, abruptly acuminate. Corolla about 17 mm long, usually blue, rarely pinkish or purplish, tube expanded upward; anthers essentially glabrous, not explanate, staminode mostly short exserted, conspicuously yellow-bearded toward the expanded tip.

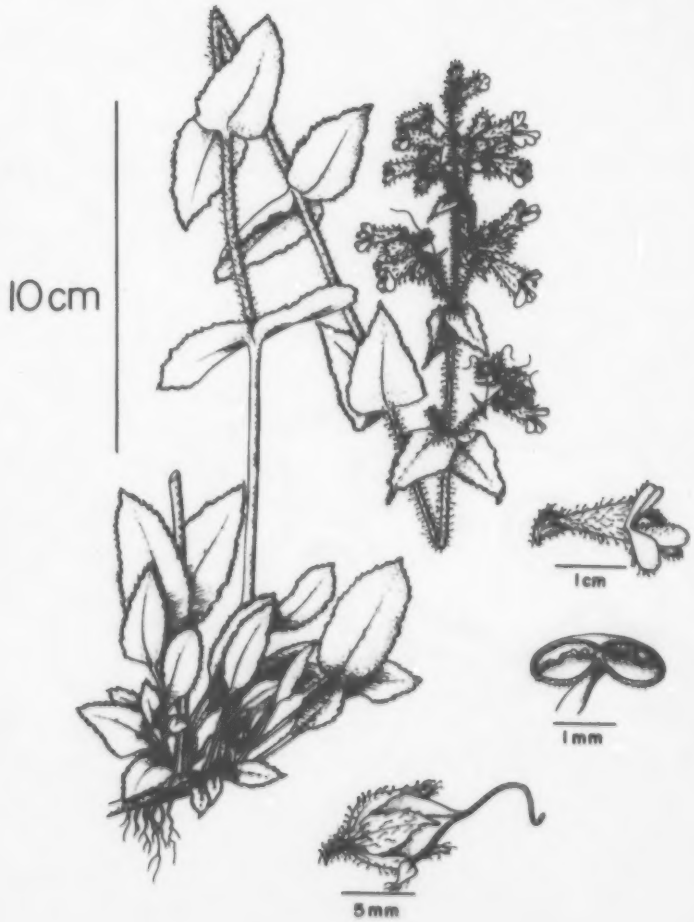
Dry hills, disturbed areas and banks, sometimes on talus at moderate altitudes; southeastern British Columbia and southwestern Alberta, south to northern Idaho and western Montana, east to northern Wyoming, western North Dakota, and southern Manitoba. Collected only in the Crow's Nest Pass.



Shining penstemon (*Penstemon nitidus*).

13. *Penstemon ovatus* Dougl.—Perennial. Stems stout, up to 10 dm tall, several from a superficial woody caudex, spreading-hirsute in the inflorescence, glabrous below. Leaves bright green, essentially glabrous, sharply serrate-dentate, the basal broadly lanceolate to ovate, the blade about 12 cm long and half as wide, about as long as the petiole; stem leaves more triangular-ovate. The inflorescence large and open, strongly glandular-hirsute. Calyx about 4 mm long, lobes elliptic-oblong to broadly ovate, acuminate, narrowly or scarcely scarious-margined. Corolla deep blue or blue-purple, up to 20 mm long, externally glandular-hairy, lower lip much longer than the upper, palate hairy, guide lines more or less evident; anthers may become explanate, glabrous, staminode bearded toward the curved tip, slightly exserted.

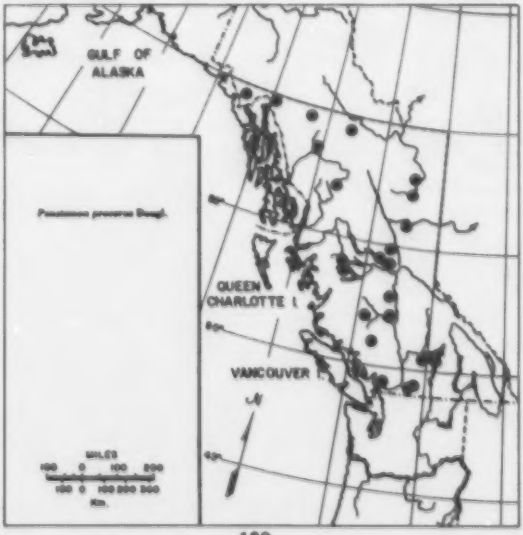
Open woods, open mossy ledges west of the Cascades, southern British Columbia to northern Oregon. Lower Fraser Valley and Vancouver Island.



Broad-leaved penstemon (*Penstemon ovatus*).

14. *Penstemon procerus* Dougl.—Stems slender, mostly not more than 4 dm tall, more or less tufted from a superficial woody caudex, basal rosettes well developed in some cases, essentially glabrous throughout or the sepals puberulent. Leaves deep green, entire, the basal petioled, oblanceolate to ovate, up to 10 cm long, stem leaves few, mostly sessile and smaller. Inflorescence of 1–several dense verticillasters, the lowest on short peduncles, the upper crowded. Calyx as much as 6 mm long, segments oblong at base abruptly caudate or gradually acute, margins at base tending to be scarious and erose. Corolla deep purple-blue but sometimes yellowish-white, about twice as long as the calyx, tube narrow moderately dilated at the throat, not strongly 2-lipped; staminode more or less bearded at the tip, about as long as the fertile stamens, anthers glabrous becoming explanate (including *P. tolmiei* Hook.).

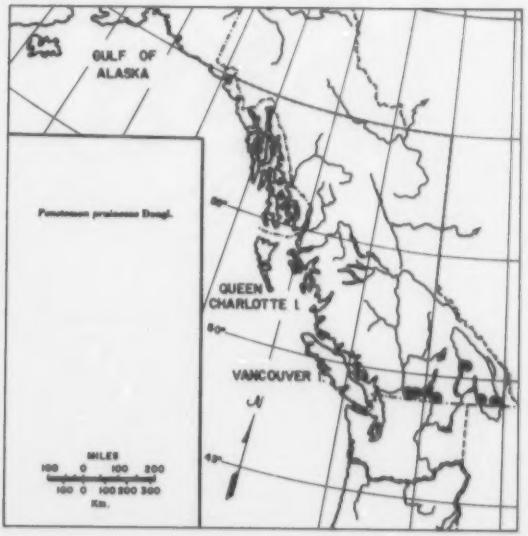
Dry soil, often in open woods; rocky slopes from mid-altitudes to above timberline east of Coast Mountains, Alaska to Alberta and Saskatchewan, south to California and Colorado. General except on Vancouver Island.

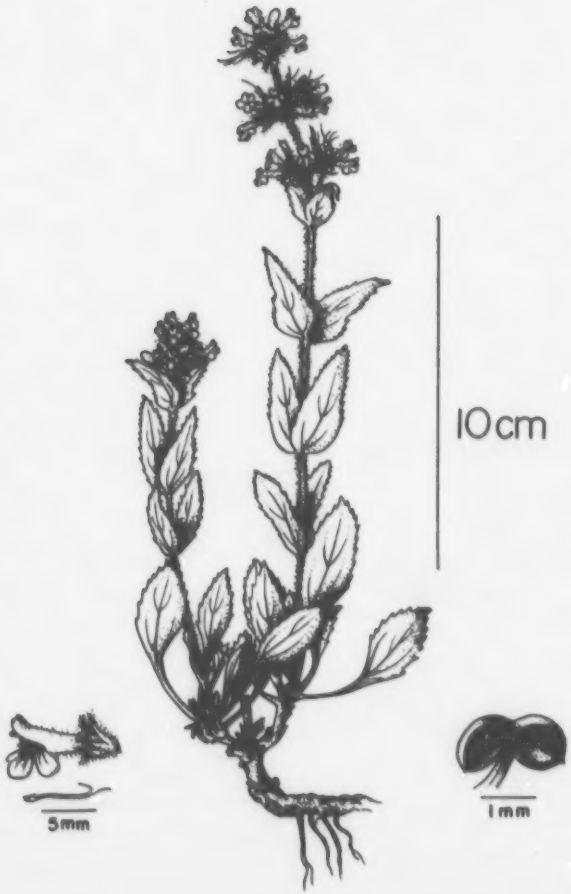


Small-flowered penstemon (*Penstemon procerus*).

15. ***Penstemon pruinosus*** **Dougl.**—Stems clustered, usually not much over 3 dm tall, from a stout caudex, herbage variably viscid-puberulent throughout, sometimes densely cinereous below. Leaves serrate-denticulate, the basal lanceolate to ovate, up to 10 cm long, long slender petiolate, stem leaves oblong to lance-ovate, mostly sessile. Inflorescence of several compact verticillasters but flowers usually not numerous, rachis glandular-hairy. Calyx 4–6 mm long, segments lanceolate to oblong, acuminate or acute, scarcely scarious-margined. Corolla deep purple-blue, sometimes paler, 10–16 mm long, glandular-hairy externally, 2-lipped with the lower lip the larger, throat marked with guide lines, palate bearded; anthers glabrous, not as a rule becoming explanate, staminode scarcely expanded at the bearded tip.

Sage brush, open forest, and rocky slopes to mid-altitudes, east of the Cascades; southern British Columbia and northern Washington. Dry Interior.

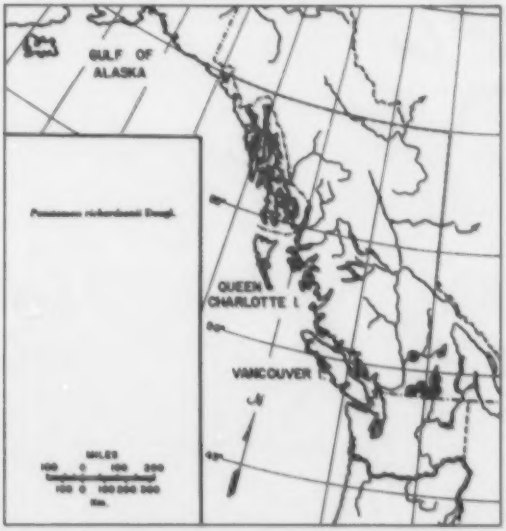


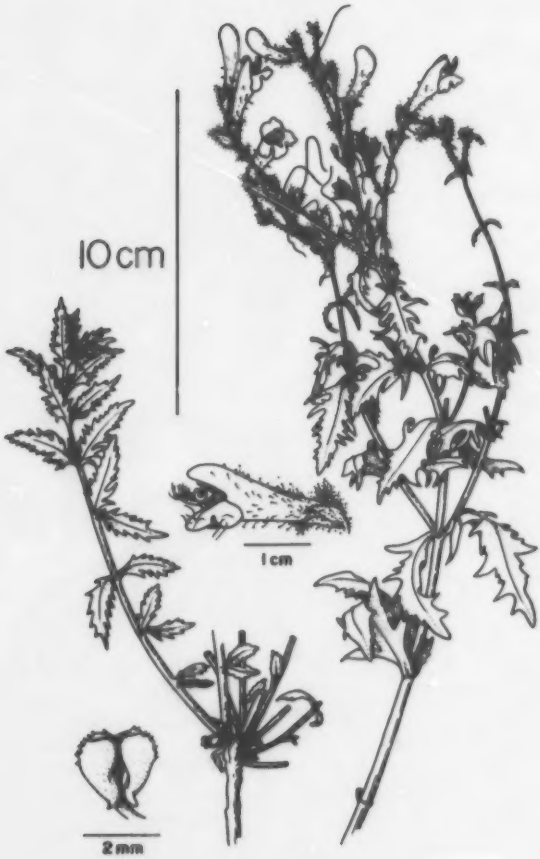


Chelan penstemon (*Penstemon pruinosus*).

16. *Penstemon richardsonii* Dougl. — Stems distinctly shrubby at base, up to 8 dm tall, usually numerous, brittle and slender, glabrous to puberulent. Leaves opposite, all cauline, the lower short-petioled and reduced, the upper sessile, sharply serrate-dentate to irregularly pinnatifid, glabrous, up to 7 cm long. Inflorescence glandular-hairy, racemose to openly much-branched; peduncles usually divergent. Calyx 4–9 mm long, lanceolate to ovate, greenish or purplish, usually entire and unequal. Corolla bright lavender to rose-lilac, glandular-hairy externally, strongly 2-lipped, lower lip sometimes with white hairs near the mouth, guide lines prominent; anthers somewhat sparsely or moderately long-bearded at its scarcely expanded tip, usually well exserted.

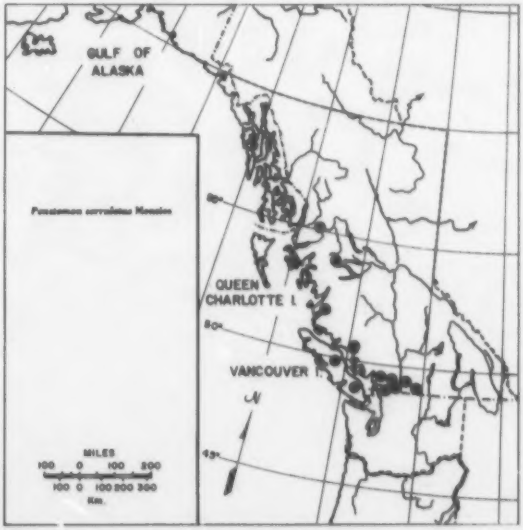
Dry, open, mostly rocky places at low elevations east of the Cascades; extreme southern British Columbia to Oregon. Known only from the Keremeos and Osoyoos areas.

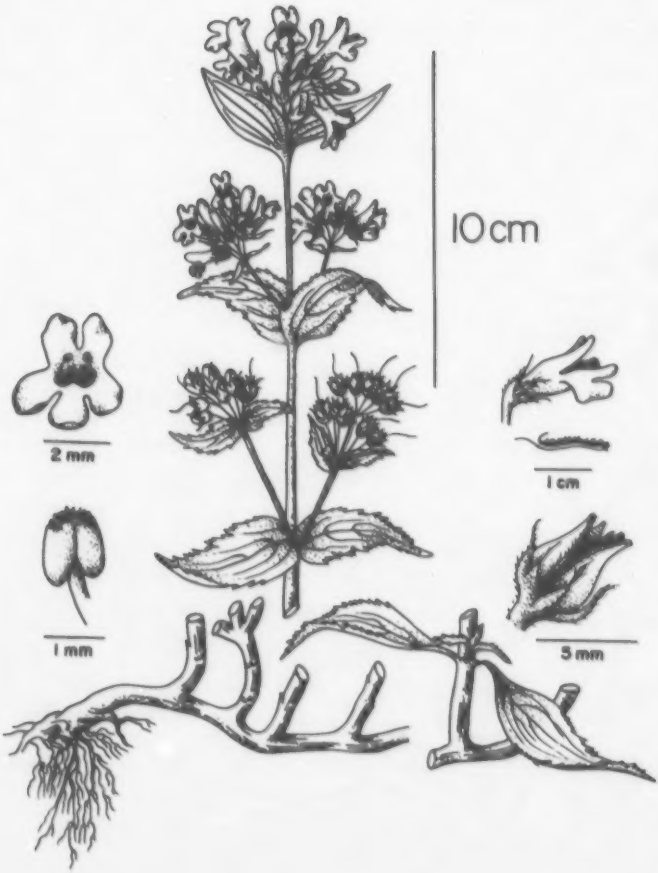




Richardson's penstemon (*Penstemon richardsonii*).

17. *Penstemon serrulatus* Menzies—Subshrub up to 7 dm tall, herbage often glabrous below, usually puberulent above, particularly on stems and within the inflorescence. Leaves subentire to irregularly serrate, dentate or shallowly laciniate, often with undulate margins, 2–9 cm long, 6–45 mm wide, basal broadly lanceolate, elliptic or spatulate, subsessile or usually with a petiole one-third to one-half the length of the blade, upper stem leaves broadly lanceolate to cordate, sessile or clasping. Inflorescence narrow made up of 1–5 clusters of flowers, the lower long-peduncles and well separated, the upper crowded, peduncles usually appressed to the main axis. Calyx 6–11 mm long, sepals linear-lanceolate to ovate, entirely herbaceous, margins becoming ciliolate, usually entire but frequently laciniate on wider sepals. Corolla deep blue to dark purple, up to 23 mm long, glabrous and sometimes pubescent within at base of lower lip; lower pair of stamens reaching well into lip, upper pair extending to summit of throat, filaments glabrous, staminode yellow-bearded for outer half of its length.





Coast penstemon (*Penstemon serrulatus*).

Capsule somewhat exceeding the appressed sepals (*P. diffusus* Dougl.).

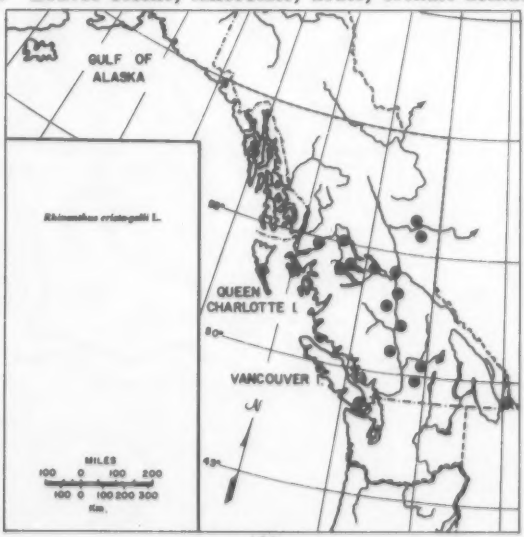
Open places, particularly along streams; southern British Columbia to central Oregon. Southwestern British Columbia as far north as the Skeena River.

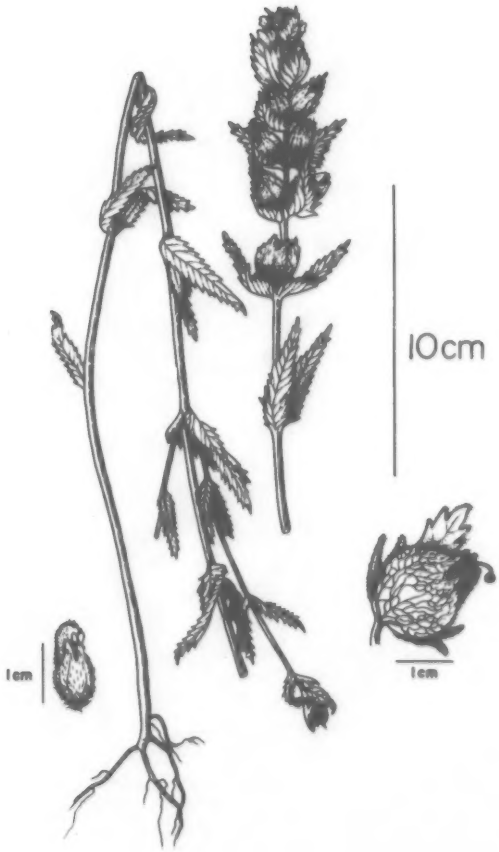
RHINANTHUS L. Rattle

Annual herbs. Leaves opposite, toothed. Inflorescence terminal, leafy-bracted spikes. Calyx flattened and inflated at anthesis, accrescent, with 4 entire teeth. Corolla 2-lipped, upper laterally compressed with 2 teeth, the lower 3-lobed. Stamens 4, included in the upper lip. Capsule compressed; seeds large, few, usually winged.

About 25 species in the North Temperate regions.

***Rhinanthus crista-galli* L.**—Stems up to 8 dm tall, simple or with a few branches, thinly villous-pubescent on opposite 2 of the 4 sides. Leaves sessile, lanceolate, acute, crenate-dentate, finely





Yellow rattle (*Rhinanthus crista-galli*).

appressed-pubescent, rounded below. Bracts gradually reduced upward, resembling the leaves but usually shorter and relatively broader. Fruiting calyx up to 16 mm long and nearly as wide, calyx-lobes acute, finely pubescent. Corolla about 10 mm long; galea yellow or brown with violet, sometimes white, teeth. Capsule about 8 mm long and slightly wider; seeds about 3 mm in diameter.

Open places and moist grassy slopes; circumboreal, south in North America to New York, Colorado, and northwest Oregon. General throughout the Province.

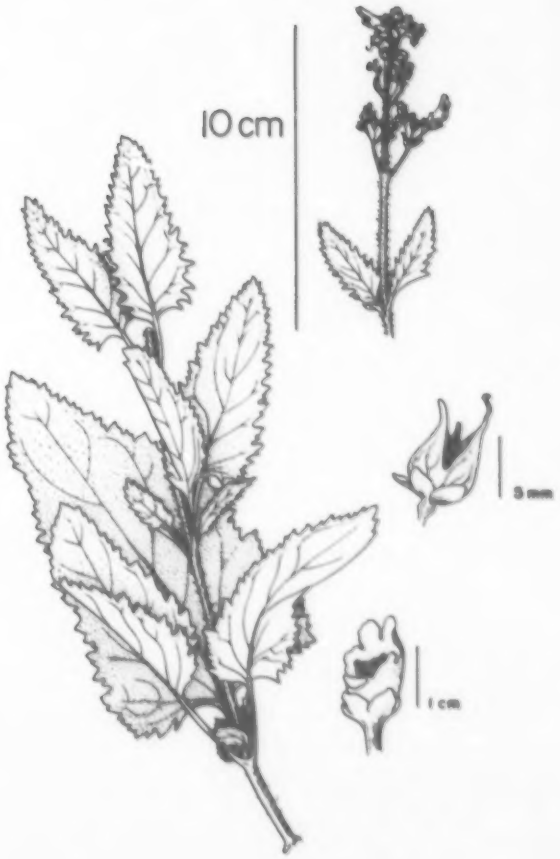
SCROPHULARIA L. Figwort

Perennial herbs. Stems quadrangular. Leaves opposite, petiolate, serrate or incised. Inflorescence terminal, open, branched, panicle-like. Flowers small, greenish or brownish; calyx regular, deeply saucer-shaped, divide about to the middle into 5 obtuse lobes; corolla 2-lipped, the upper pointing forward, 2-lobed, the lower, 3-lobed, shorter, the lateral also directed forward, the central deflexed; stamens 4, didynamous, the staminode dilated at the summit, included under the upper corolla-lip. Capsule ovoid to globose; seeds angular, rugose.

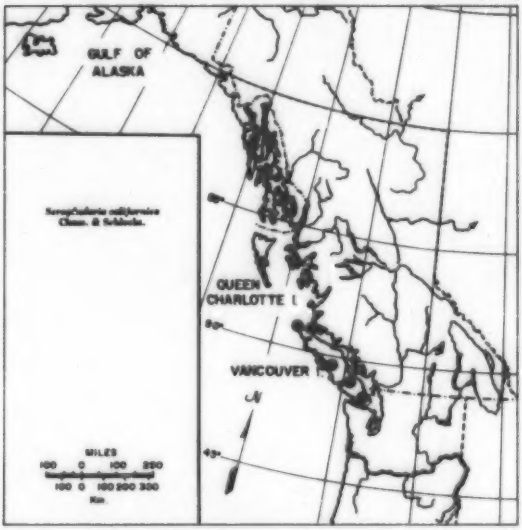
About 150 species, which, except for about a dozen, are all Eurasian.

***Scrophularia californica* Cham. & Schlecht.**—Stems erect to 15 dm tall, finely glandular-pubescent. Leaf-blades ovate or triangular-ovate, acute, simple or doubly serrate, about 10 cm long, truncate or cordate; petioles 3–5 cm long. Panicle narrow with ascending spreading branches. Sepals about 4 mm long, lobes oblong to ovate. Corolla 9–15 mm long, generally brownish to maroon, the lowermost lobes recurving; staminode brown, clavate to obovate. Capsule ovoid-conic, about 7 mm long.

Low, moist ground, often along stream sides; southwestern British Columbia to California and adjacent Nevada, west of the Cascades. Vancouver Island only.



California figwort (*Scrophularia californica*).



VERBASCUM L. Mullein

Biennial (ours), in the first year produced a rosette of leaves from which a tall, flowering stem arises in the following season. Leaves alternate, entire, crenate, or sometimes deeply toothed. Inflorescence one or several, elongate, racemes or spike-like racemes. Flowers mainly yellow. Calyx nearly regular, deeply 5-parted. Corolla rotate with 5 nearly equal lobes, tube very short; stamens 5; all fertile, the two lower filaments differing from the three upper in length and pubescence. Capsule ovoid to globose, the 2 valves more or less cleft at the summit: seeds small, numerous.

A genus of more than 250 species, mainly Mediterranean, but extending into northern Europe and Asia as well.

Calyx and other parts of the plant glandless, thinly to densely covered with branched hairs.

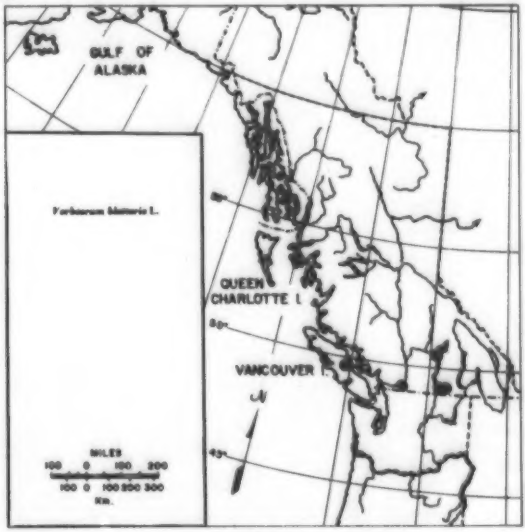
Leaves decurrent on the stem, usually as far as the next leaf below ..... *V. thapsus*

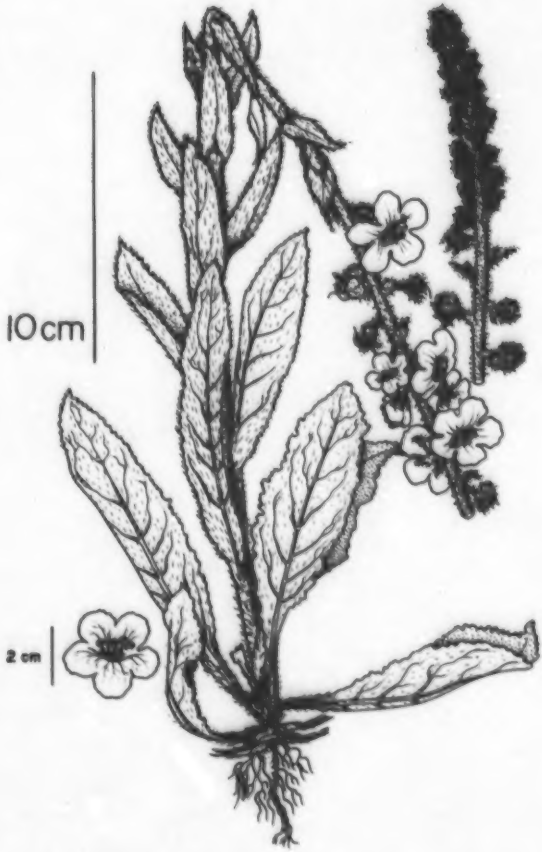
F3

Leaves not decurrent on the stem, or only very shortly so—
.....*V. phlomoides*
Calyx and other parts of the plant with short, stout, gland-tipped hairs, possibly with some long, simple hairs as well .....*V. blattaria*

1. ***Verbascum blattaria L.***—Stem erect to 1m, angled, glabrous below, glandular in the inflorescence. Leaves glabrous, rosette leaves up to 25 cm long, lanceolate or oblong, gradually narrowed to the base, coarsely toothed to nearly entire, stem leaves smaller, becoming triangular upward, cordate at base, sessile, with acute triangular teeth. Racemes terminal, occasionally with additional axillary racemes. Flowers single at each node in the axil of a bract, pedicellate. Calyx glandular-pubescent, sepals linear-elliptic, leaf-like, considerably shorter than the pedicels. Corolla yellow to white, about 2.5 cm wide, filaments all with purple hairs. Capsule subglobose, equal to or longer than the clayx.

Wasteland and disturbed places; Eurasia, widely naturalized in temperate North America. Locally established in southern British Columbia.

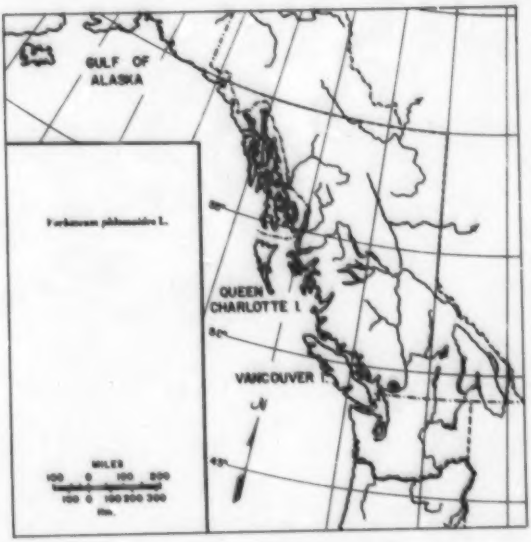


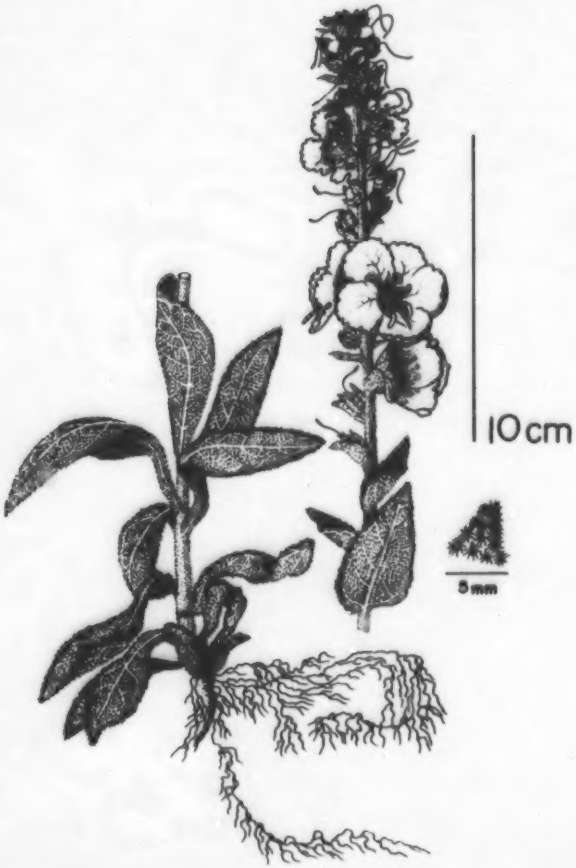


Moth mullein (*Verbascum blattaria*).

2. *Verbascum phlomoides* L.—Stems erect to 12 dm tall, white to yellowish, hairy. Rosette leaves oblong, doubly or deeply crenate, tomentose on both sides, stem leaves becoming more lanceolate, shorter, little, if at all, decurrent, glabrous above, tomentose beneath. Raceme at first dense, later elongating to expose the axis between flower clusters. Calyx longer than the pedicels, hairy, calyx lobes triangular-lanceolate. Corolla yellow, 2.5–3.5 cm wide; upper 3 filaments densely white-villous, the lower 2 glabrous or nearly so.

Waste and disturbed places; southern Europe, locally naturalized as a weed in temperate North America. Apparently established in the lower Fraser Valley.

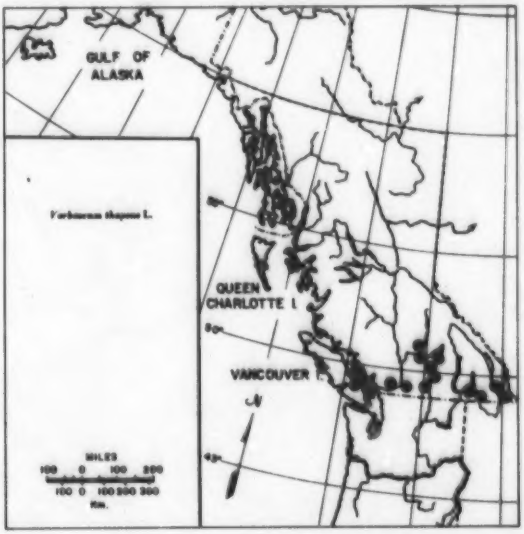


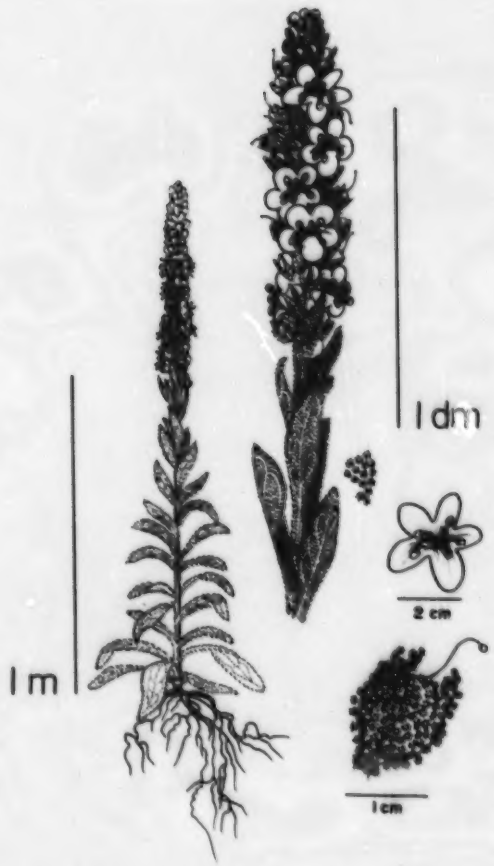


Woolly mullein (*Verbascum phlomoides*).

3. ***Verbascum thapsus*** **L.**—Biennial, rarely annual. Stems erect, up to 2 m tall, densely covered with dense, woolly tomentum. Leaves obovate-lanceolate to oblong, more or less acute, crenate, rosette leaves up to 45 cm long, attenuate into a narrowly winged petiole, stem leaves smaller, progressively reduced upward, sessile, decurrent to the next leaf below. Inflorescence a dense terminal raceme, rarely with axillary racemes; bracts triangular-lanceolate, acuminate with a long point, usually somewhat longer than the flowers; pedicels almost lacking. Sepals triangular-ovate, acute. Corolla yellow, up to 3 cm wide, concave; 3 upper filaments with whitish or yellowish hairs, lower 2 filaments longer, glabrous or nearly so. Capsule ovoid, somewhat longer than the calyx.

Common in open, usually dry places; Eurasia; commonly established throughout temperate North America. Widespread and common in southern British Columbia.





Common mullein (*Verbascum thapsus*).

VERONICA L. Speedwell

Annual or perennial herbs. Foliage leaves opposite, occasionally whorled, the bracteal leaves alternate or rather irregularly scattered. Flowers blue or white, borne in terminal or axillary racemes or spikes, or solitary in the upper axils. Calyx deeply 4-parted, the lobes equal or the upper shorter; corolla rotate, the tube much shorter than the lobes, lobes 4, the lateral or the lowest commonly narrower than the others; stamens 2, inserted at the throat of the corolla, exserted; ovary short, flattened, stigma 1, style exserted. Capsule emarginate to obcordate, more or less flattened.

A large genus of well over 200 species, almost all North Temperate, the majority in Eurasia.

PENNELL, F. W. "Veronica" in North and South America. Rhodora **23**:29–41. 1921.

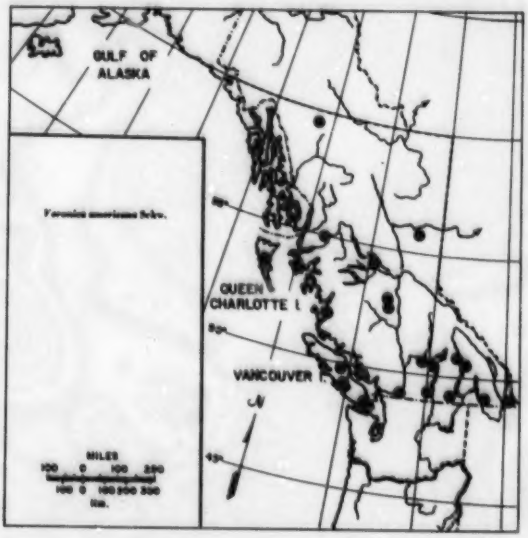
1. Main stem terminating in an inflorescence, its flowers crowded or remotely axillary; in all cases the upper bract-leaves alternate.
   2. Perennial from subterranean rhizomes.
      3. Capsule as long or longer than wide, somewhat or not notched; stems erect, nearly or quite, from the base.
         Style longer than the capsule; filaments equal to or exceeding the corolla ..... *V. cusickii*
         Style less than half the length of the capsule; filaments shorter than the corolla ..... *V. wormskjoldii*
      3. Capsule obviously wider than long, notched for one-fourth of its length; stems creeping at the base or with prostrate lower branches ..... *V. serpyllifolia*
   2. Annual, fibrous-rooted, but without rhizomes.
      4. Pedicels shorter than the lanceolate or linear sepals; capsule strongly flattened; stems erect.
         Leaf blades, except the lowermost, sessile, those of the lower stem oblanceolate, nearly entire to dentate; corolla whitish throughout; plant glabrous or with minute, usually gland-tipped hairs ..... *V. peregrina*
         Leaf blades petioled, or the upper nearly sessile, those of the lower stem ovate, crenate-serrate corolla deep violet-blue; plant pubescent with white glandless, or obscurely gland-tipped, hairs ..... *V. arvensis*

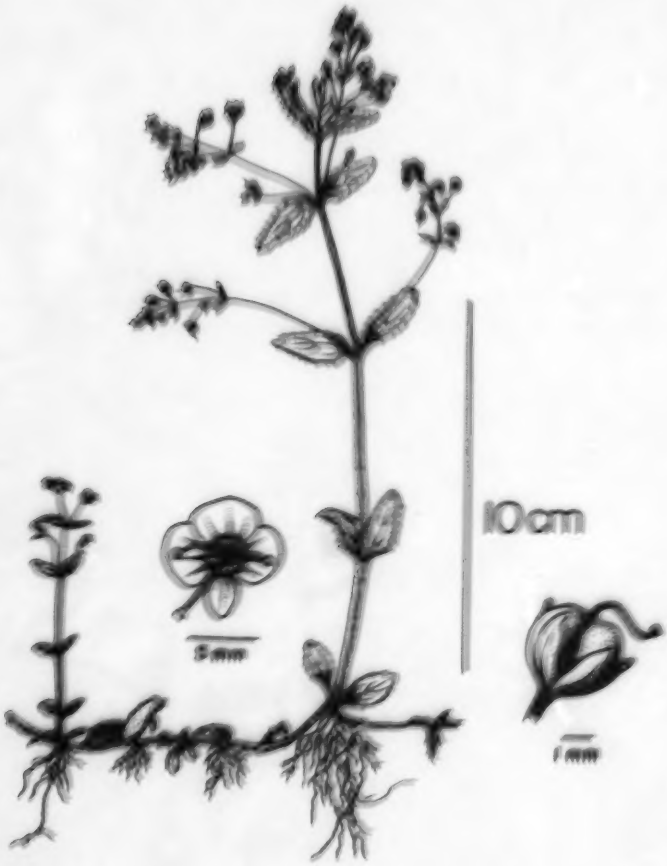
4. Pedicels longer than the ovate sepals; capsule relatively turgid; plants repent.
   Perennial; leaves cordate-orbicular to reniform, slightly toothed; leaf blades mostly about 0.5 cm long; pedicels several times as long as the leaves ..... *V. filiformis*
   Annual; leaves triangular to broadly elliptic or ovate, crenate-serrate, more than 1 cm long; pedicels not more than twice as long as the leaves ..... *V. persica*

1. Main stem never terminating in an inflorescence; leaves opposite throughout and the flowers in all axillary racemes.
   5. Capsule pubescent; stems, pedicels, leaves, and sepals pubescent; leaf blades oval or ovate, crenate-serrate to dentate; plants of dry soil.
      Leaf blades dentate, cordate or truncate at base; sepals 3.5–5.0 mm long, linear-lanceolate, exceeding the capsule; capsule with hairs neither glandular nor dark-jointed; stem ascending ..... *V. chamædrys*
      Leaf blades oval, crenate-serrate, narrowed to a petiolar base; sepals 2–3 mm long, oblong-lanceolate, shorter than the capsule; capsule with hairs dark-jointed, some of them glandular; stem repent ..... *V. officinalis*
   5. Capsule glabrous or with a few minute gland-tipped hairs; stems, pedicels, leaves, and sepals glabrous, or rarely pubescent; leaf blades oblong-ovate to linear, finely serrate to entire; aquatic plants.
      6. Capsule not conspicuously wider than high, scarcely or not 2-lobed; sepals nearly or quite equal to the capsule; leaf blades oblong-ovate to lanceolate; pedicels relatively stout, ascending spreading.
         Leaf blades all petioled ..... *V. americana*
         Leaf blades, at least the upper on flowering stems, sessile and clasping ..... *V. catenata*
      6. Capsule much wider than long, strongly 2-lobed; sepals shorter than the capsule; leaf blades linear or lanceolate; pedicels filiform, reflexing in fruit ..... *V. scutellata*

1. ***Veronica americana*** **Schw.**—Perennial. Stems succulent or fleshy, glabrous, prostrate or sprawling, rooting at the nodes. Leaves lanceolate to narrowly ovate, more or less acute, serrate or dentate, broadly rounded or truncate at the base; petioles margined, 5–10 mm long. Racemes several, arising from the upper axils, flowers at first close together, but the racemes soon elongating so that the flowers may be 10 mm apart. Pedicels much longer than the linear bracts. Corolla violet to lilac, about 5 mm wide. Capsule turgid, about 4 mm wide and nearly as long not notched, style persistent, about 3 mm long.

Shallow water and damp places; Alaska to Newfoundland, south to California, Mexico, Nebraska, east to North Carolina. General throughout the Province, coastal in the north.

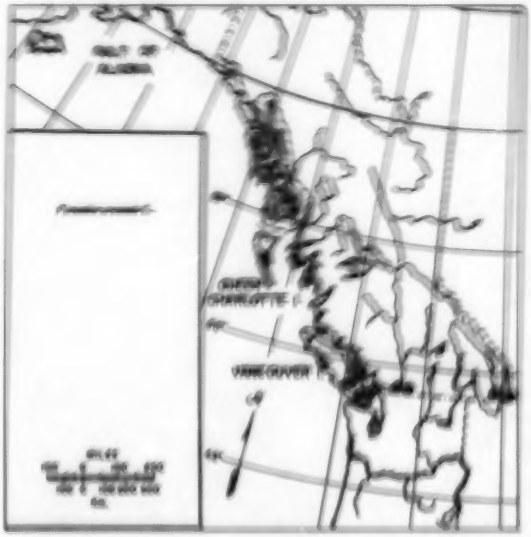




American brooklime (*Veronica americana*).

2. Veronica arvensis L.—Annual. Stems erect, 5–25 cm tall, simple or branched at the base with ascending branches, pubescent, sometimes glandular. Leaves usually less than 1.5 cm long, triangular-ovate, coarsely crenate-serrate, the lower stalked, the upper sessile. Racemes long, lax, constituting the greater part of the stem; upper bracts lanceolate, entire, ciliate, longer than the flowers; pedicels less than 1 mm long. Calyx lobes oblong to oblanceolate, blunt, the lower pair about 4 mm long, the upper shorter. Corolla blue, shorter than the calyx; style 1 mm long or less. Capsule about as long as broad, obcordate, ciliate, shorter than the calyx.

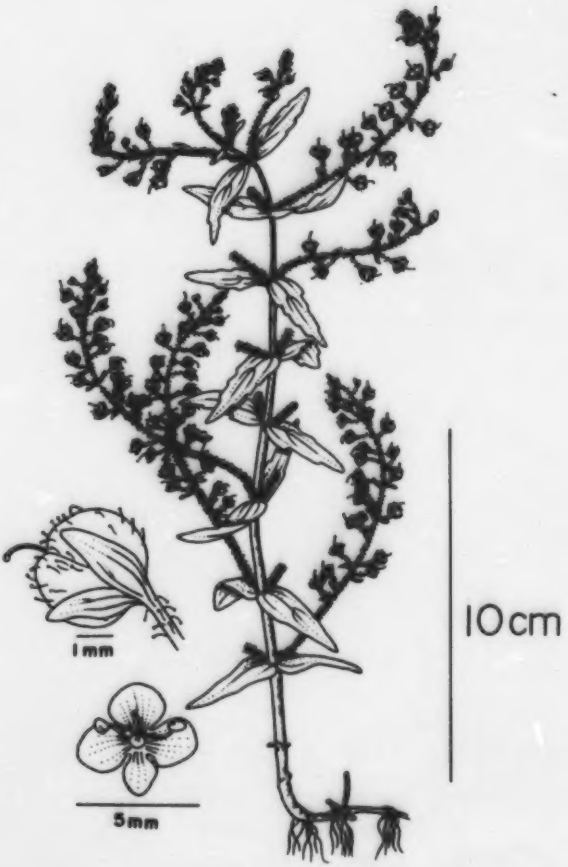
Cultivated ground, grassland and open places generally; Eurasia; naturalized locally in North America. Locally established in British Columbia.



Field speedwell (*Veronica arvensis*).

8. Veronica catenata Pennell—Perennial. Stems creeping or sprawling, up to 10 dm long, rooting at the nodes, branches ascending, glabrous (with us). Leaves sessile, narrowly lanceolate, oblong or oblanceolate, 3–5 times as long as wide, entire or obscurely serrate. Inflorescence up to 15 cm long, rather few-flowered. Flowers white to pink or pale bluish. Fruiting pedicels diverging at 60–90°. Calyx lobes ovate or ovate-oblong, obtuse or barely apiculate, not surpassing the capsule. Capsule suborbicular, 3–4 mm wide, nearly as long, shallowly but distinctly notched, the turgid lobes separated by deep median furrows; style about 1.5 mm long (*V. salina* Schur., *V. comosa* Richt., *V. communis* Raf.).

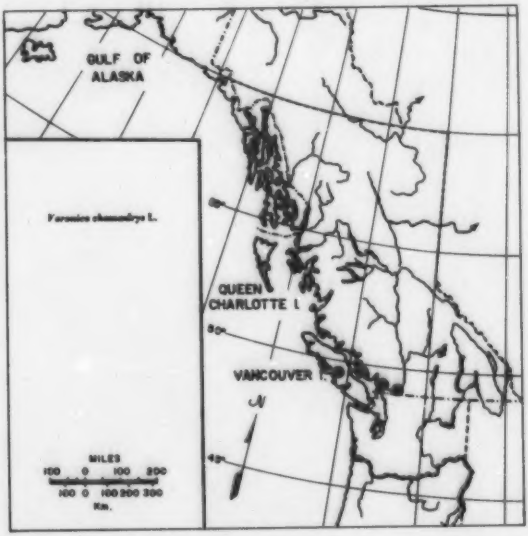
In slowly flowing water or on wet shores; widespread in the United States and southern Canada; Europe. Known with us only from Cranbrook and Esquimalt.

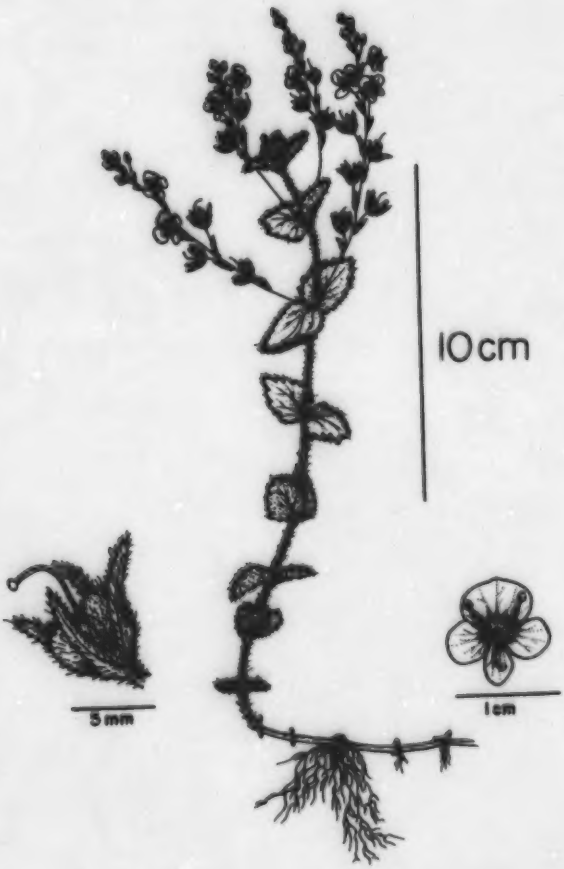


Chain speedwell (*Veronica catenata*).

4. ***Veronica chamædrys*** **L.**—Perennial. Stems prostrate, rooting at the nodes, ascending at the tips, pubescent with long, white hairs in two lines on opposite sides, glabrous between. Leaves all opposite, up to 2.5 cm long, triangular-ovate, sessile or short-petioled, subobtuse, subcordate to cordate at base, coarsely crenate-serrate, pubescent on the margins and the veins below. Racemes few, erect, from the upper axils, loosely flowered; bracts lanceolate, about equal to or shorter than the pedicels. Calyx lobes more or less lanceolate, hairy, nearly equal. Corolla about 1 cm across, bright blue with a dark eye; filaments and style blue. Capsule obcordate, shorter than the calyx, broader than long, ciliate and pubescent.

Grasslands, open woods, and waste ground; Eurasia; locally naturalized in North America. Apparently established in a few places on the Lower Mainland and Vancouver Island.

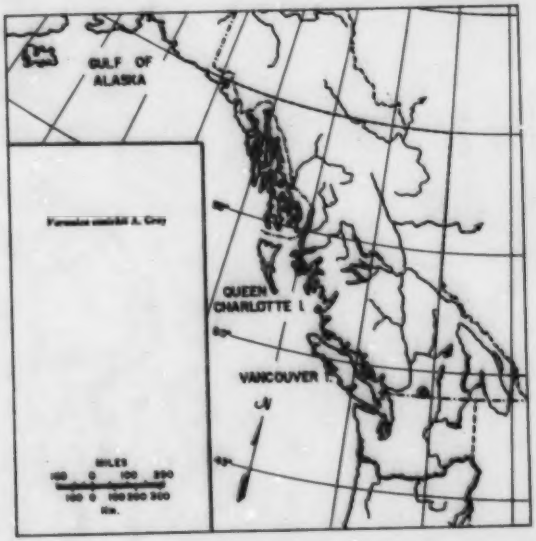


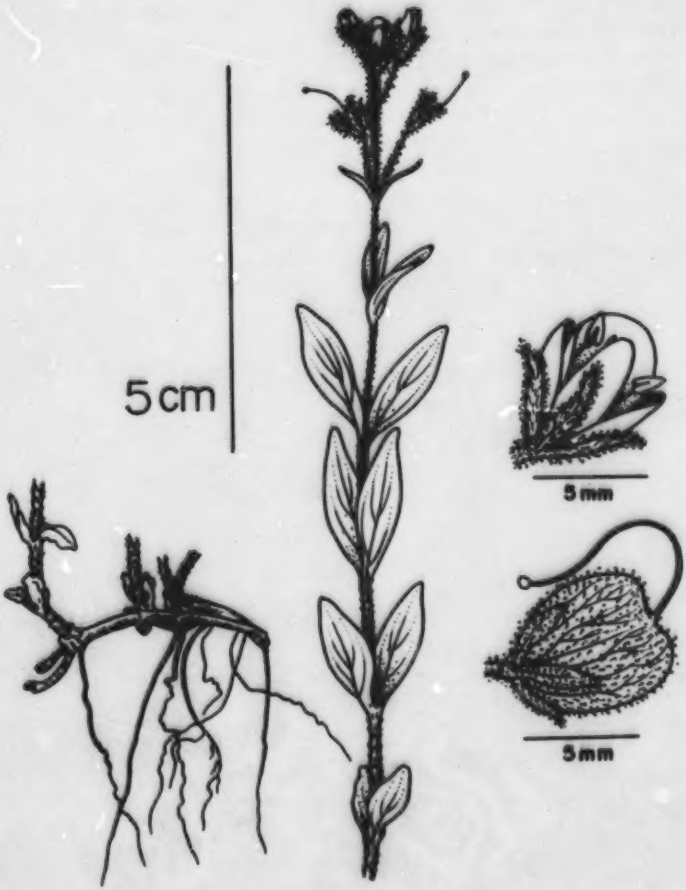


Germander speedwell (*Veronica chamædrys*).

5. ***Veronica cusickii*** **A. Gray**—Perennial. Stems somewhat woody below, erect to 1.5 dm tall, finely glandular-pubescent. Leaves elliptic-oval, obtuse to acutish, glabrous, entire, sessile. Racemes terminal, bracts small, pedicels up to 9 mm long. Calyx lobes unequal, narrowly ovate. Corolla 10–13 mm wide, deep bluish-violet; style 6–9 mm long, conspicuously exserted. Capsule a little longer than high, shorter than the style, deeply to scarcely notched, finely glandular-pubescent.

Rocky soil in open forests and in alpine meadows; southern British Columbia and northern Washington, east to Idaho and western Montana, and northeast Oregon. With us known only from the Ashnola Mountains.

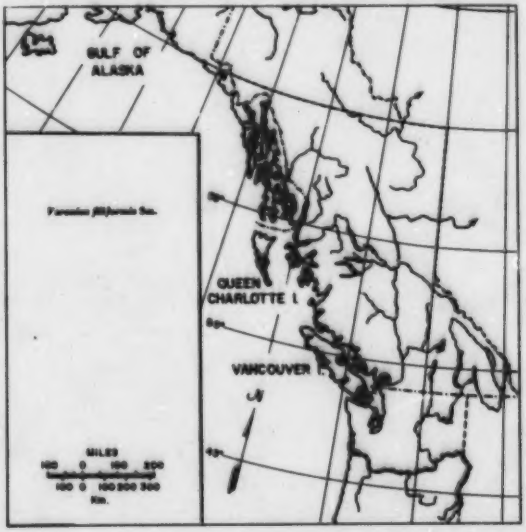


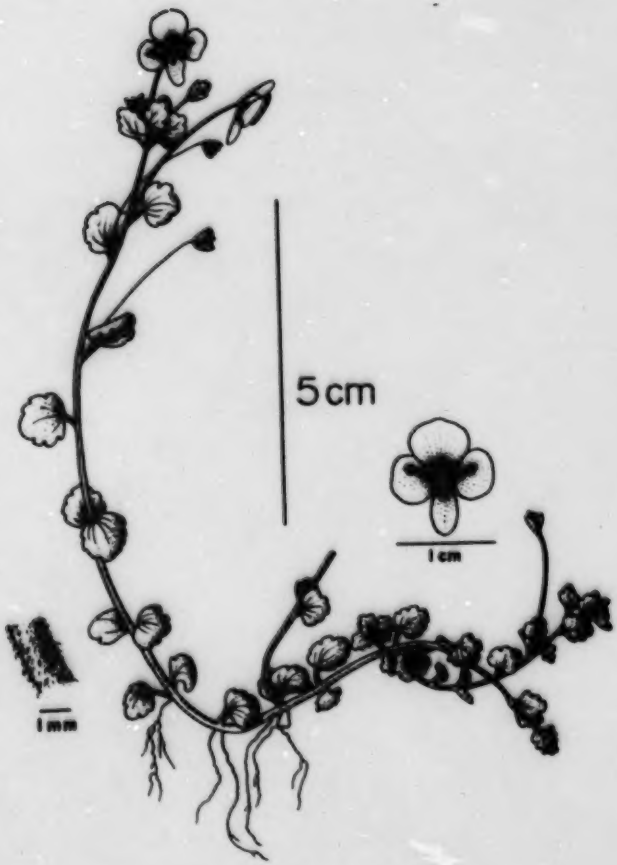


Cusick's speedwell (*Veronica cusickii*).

6. ***Veronica filiformis*** **Sm.**—Perennial. Stems numerous, creeping, densely matted, pubescent, often forming large patches. Leaves about 5 mm long, kidney-shaped, crenate, short-petioled. Pedicels filiform, several times as long as the leaves. Calyx-lobes oblong, obtuse. Corolla about 11 mm wide, bluish-purple. Capsule suborbicular.

Damp, open, grassy places; western Asia. Locally a serious lawn weed in the Lower Mainland and Vancouver Island.

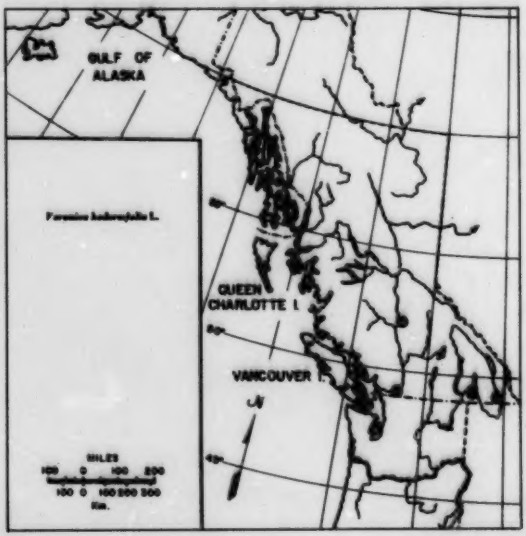


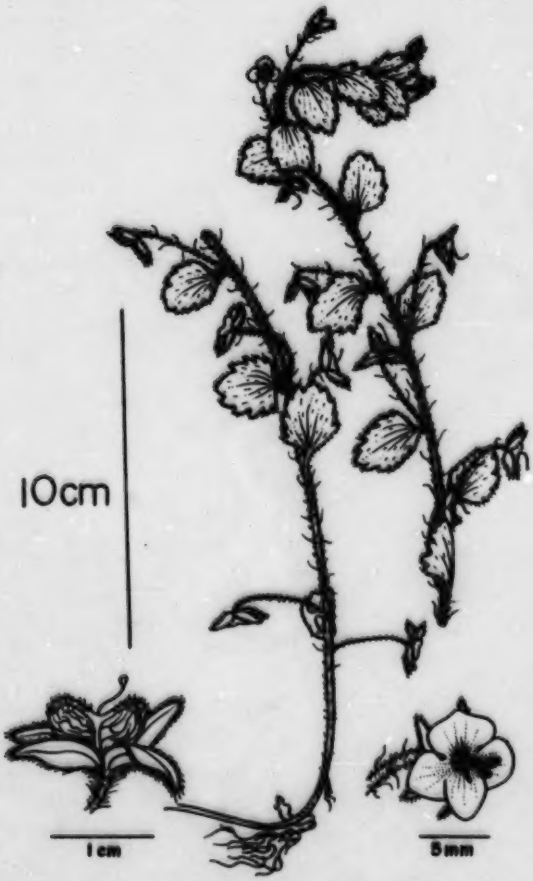


Thread-stalked speedwell (*Veronica filiformis*).

7. ***Veronica hederæfolia*** **L.**—Annual. Stems much branched, weak, prostrate or somewhat ascending, spreading hirsute. Leaves up to 2 cm broad, mostly wider than long, more or less reniform, with 2 or 3 large teeth or small lobes on each side near the base, obtuse at the apex, somewhat truncate at the base, 3-veined, ciliate, and with a few short, scattered hairs below, the petiole up to as long as the blade, lower, nonfloriferous leaves opposite, the upper floriferous leaves alternate each with a single flower in its axil. Pedicels rather shorter than the leaves but elongating in fruit. Sepals ovate, strongly cordate at base. Petals shorter than the calyx, pale lilac. Capsule glabrous, broader than long, scarcely compressed or emarginate.

Weed of damp fields and waste places; Europe; widely naturalized in the northeastern United States. Locally established in British Columbia as far north as Clinton.

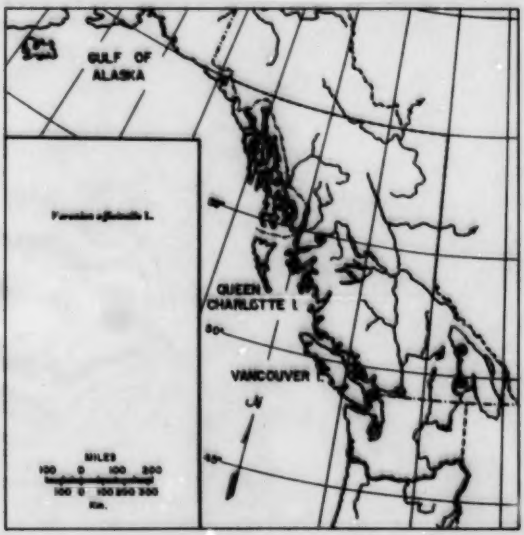


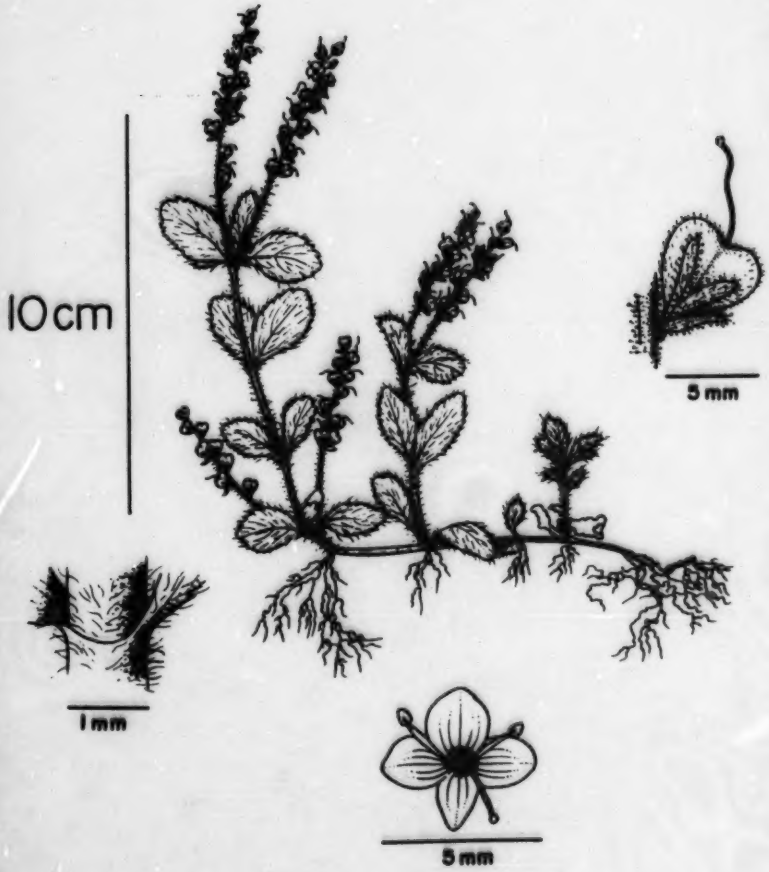


Ivy speedwell (*Veronica hederæfolia*).

8. ***Veronica officinalis*** L.—Perennial. Stems up to 40 cm long, creeping, rooting, often forming large mats, ascending at the tips, hairy. Leaves about 3 cm long, oblong to obovate-elliptic, crenate, subacute, cuneate, subsessile, hairy on both sides. Racemes few, solitary or opposite, spike-like, 3–6 cm long, on a peduncle of about the same length; bracts linear-lanceolate, about equal to the flowers, about twice as long as the pedicels. Calyx lobes lanceolate, about 3 mm long. Corolla lilac, about 6 mm wide; filaments, anthers, and style more or less lilac. Capsule obovate or obcordate, longer than the calyx, truncate or with a shallow notch; style at maturity nearly 3 mm long.

Dry fields and open woods, wasteland; western Eurasia; locally established in North America. Found locally south from about Lat. 55°N.

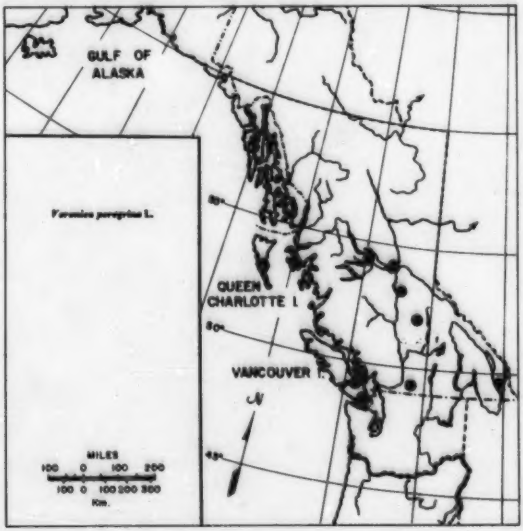


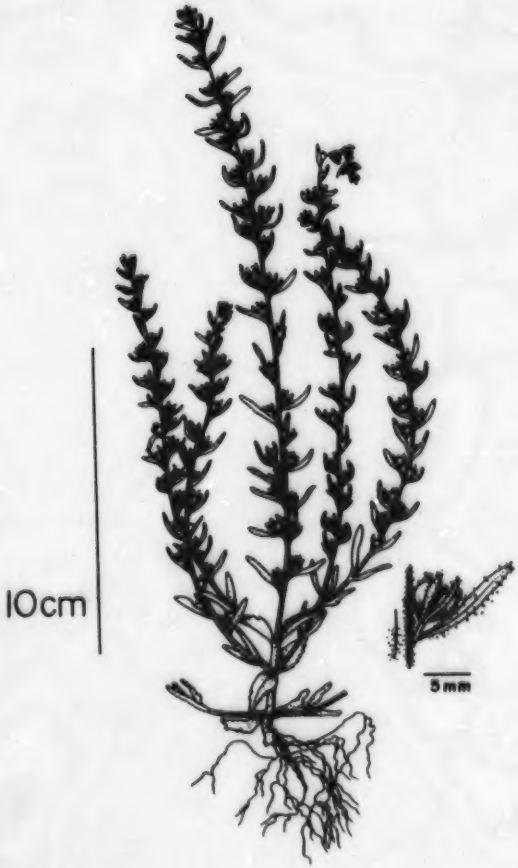


Common speedwell (*Veronica officinalis*).

9. ***Veronica peregrina*** **L.**—Annual. Stems erect, simple, or with spreading branches, glabrous, up to 4 dm tall, the lower half or less bearing opposite leaves, the upper portion flower-bearing. Leaves ovate or oblong, entire or weakly toothed, 2–3 cm long, tapering at the base to a short petiole. Racemes terminal and lax; bracteal leaves progressively smaller; pedicels about 1 mm long, calyx lobes lanceolate, about 6 times as long as the pedicel. Corolla blue, shorter than the calyx; style very short, almost lacking. Capsule (with us more or less pubescent with short gland-tipped hairs) about as broad as long, scarcely notched (*V. xalapensis* H.B.K.).

Wet meadows and wet places generally; widespread in temperate North and South America. General in British Columbia south from Prince George.

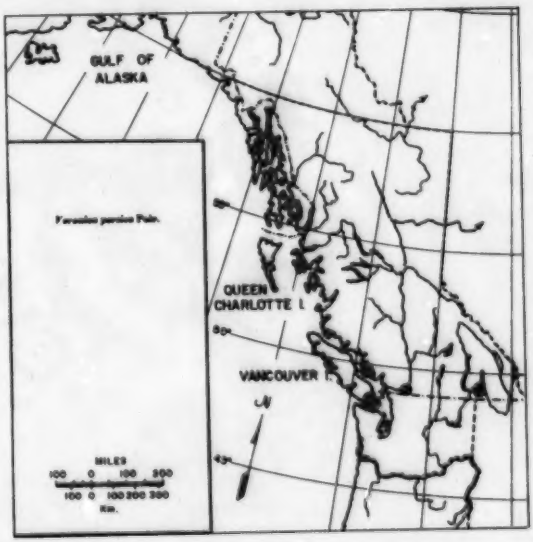


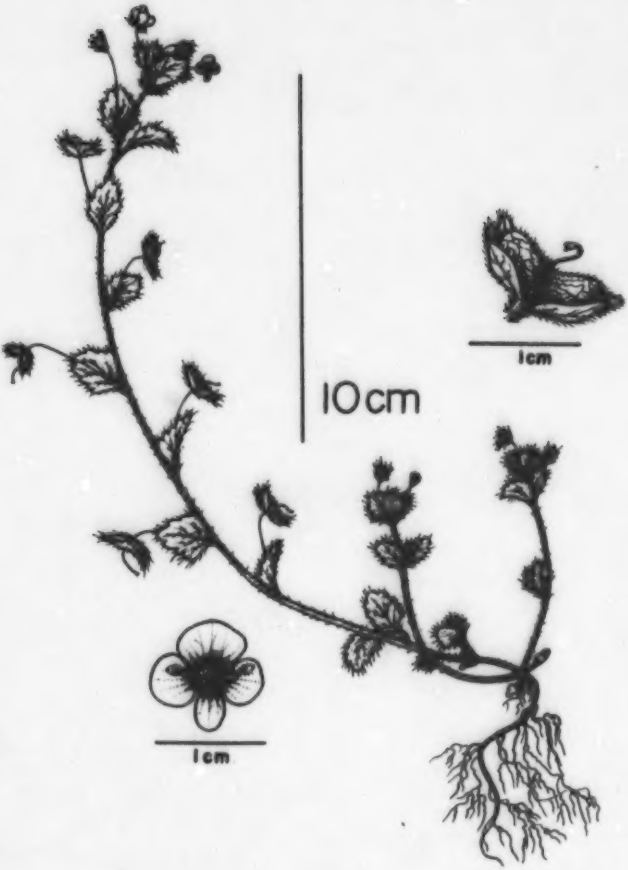


Purslane speedwell (*Veronica peregrina*).

10. *Veronica persica* Poir.—Annual. Stems up to 3 dm long, prostrate or ascending, much branched, hairy. Leaves 1–3 cm long, triangular-ovate, coarsely crenate-serrate, light green, hairy on the veins below, ciliate, short-petioled. Pedicels longer than the leaves but not twice as long, decurved in fruit. Calyx lobes about 6 mm long at anthesis, ovate, ciliate, accrescent, and strongly divaricate in fruit. Corolla 8–12 mm wide, bright blue, lower lobe often paler or white. Capsule 2-lobed, lobes sharply keeled and divergent, nearly twice as broad as high, ciliate.

Waste grassy places; western Asia; widely introduced and naturalized in North America. Known from a few localities in southern British Columbia.

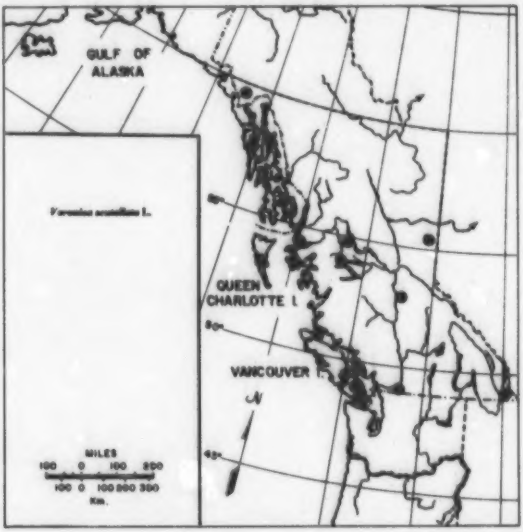




Persian speedwell (*Veronica persica*).

11. ***Veronica scutellata*** **L.**—Perennial. Stems erect or often decumbent, normally glabrous or occasionally finely pubescent, arising from shallow, creeping rhizomes. Leaves linear to linear-lanceolate, 2–4 cm long, acute, more or less amplexicaul, remotely denticulate, often tinged with purple, midrib impressed and conspicuous above. Racemes lax, alternate, few-flowered; bracts linear; pedicels slender, more than twice as long as the bracts, spreading at right angles in fruit. Sepals ovate. Corolla about 7 mm wide, white or blue, with purple lines. Capsules flat, about three-fifths as long as wide, deeply emarginate, much longer than the calyx.

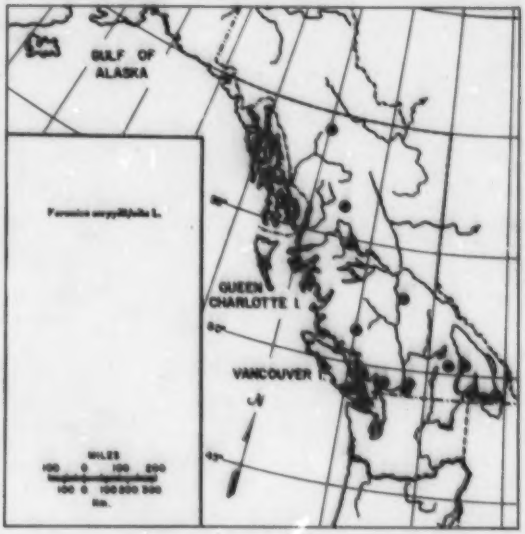
Ponds, bogs, wet meadows; Eurasia and most of temperate North America. General more or less throughout British Columbia.

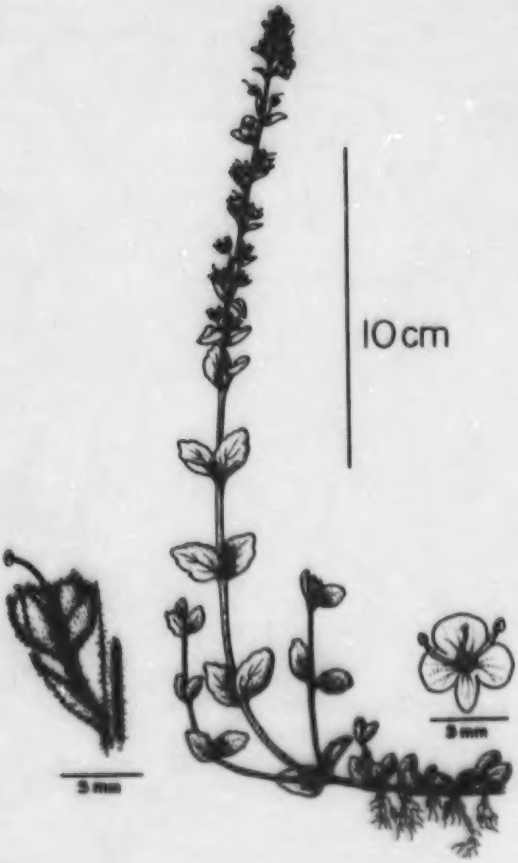


Marsh speedwell (*Veronica scutellata*).

12. ***Veronica serpyllifolia*** **L.**—Perennial. Stems creeping and forming mats, rooting at the nodes, flowering ones usually ascendent, puberulent. Leaves up to 2 cm long, oval or oblong, entire or weakly crenulate, rounded at both ends, subsessile or short-petiolate, glabrous. Racemes terminal, about 30-flowered, 10 cm or more long, lax; upper bracts narrowly oblong, the lower gradually passing into leaves, longer than the pedicels. Calyx lobes oblong. Corolla white or pale blue with darker lines; filaments and style white, anthers slaty-violet. Capsule obcordate, ciliate, broader than long, about equalling the calyx and style.

Damp meadows and similar places; Europe and northern Eurasia; widely established in North America. Generally established in British Columbia.

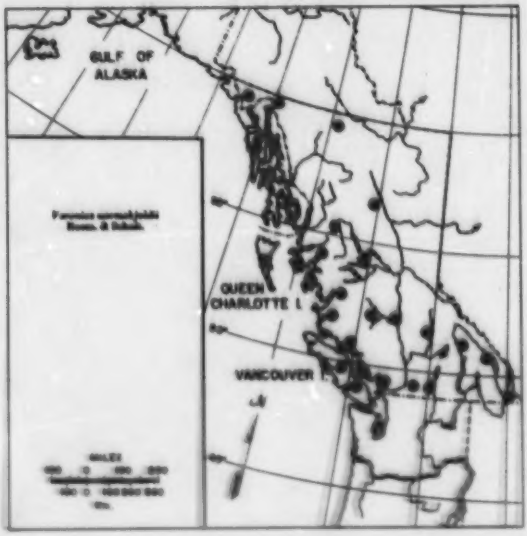


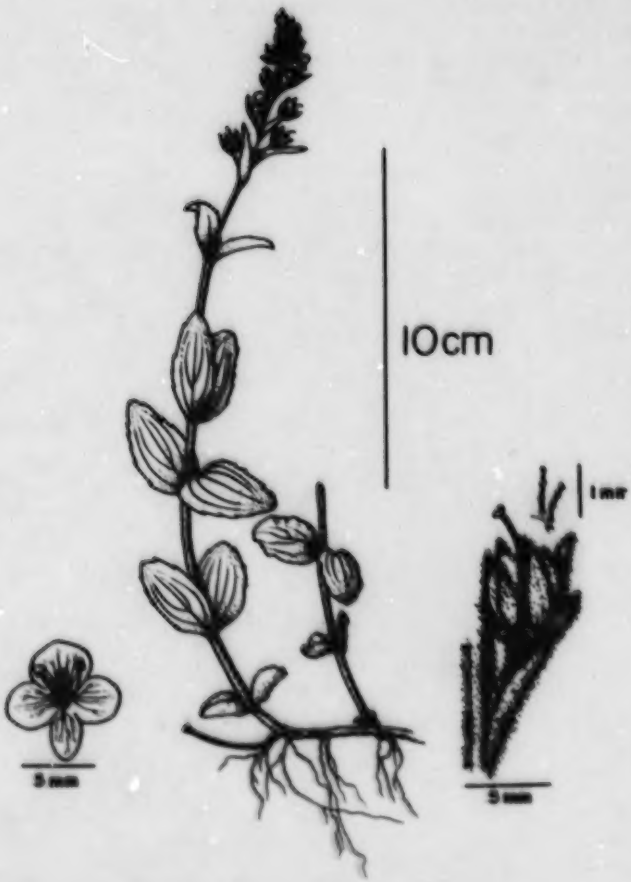


Thyme-leaved speedwell (*Veronica serpyllifolia*).

13. *Veronica wormskjoldii* Roem. & Schult.—Perennial. Stems up to 3 dm tall, simple, erect, from shallow rhizomes, sparsely to densely villous-hirsute, hairs loosely spreading, inflorescence viscid or glandular in addition. Leaves opposite, all cauline, elliptic to lanceolate or ovate, up to 3.5 cm long, rounded to acute at the tip, villous-hirsute like the stem, or often glabrous. Racemes terminal, at first compact, later usually more elongate; flowers pedicellate. Corolla dark bluish-violet, up to 10 mm wide; style short, not more than 3 mm long. Capsule a little higher than wide, broadly notched, glandular-pubescent (*V. alpina* Am. auth.).

Open, moist places at moderate to high elevations; Alaska to Greenland, south to California, New Mexico, and New England. Common throughout in the mountains.





[illegible] (Veronica verna) (Persoon).

GLOSSARY

Accrescent—Enlarging with age, as the sepals of some flowers.
Acuminate—Gradually tapering to a long point.
Acute—Ending in a sharp and well-defined angle.
Adnate—With unlike parts congenitally grown together.
Ampliate—Enlarged.
Anther—The part of the stamen that produces pollen.
Anthesis—The act of flowering; strictly, the time of expansion of a flower, but often used to designate the flowering period.
Appressed—Lying flat, pressed against some other structure.
Arcuate—Curved to some degree; arching.
Ascending—Curving upward; rising at first obliquely, then erect.
Attenuate—Slender tapering; gradually drawn out.
Axil—The upper angle formed between the axis and any organ that arises from it.
Biennial—Of two years' duration.
Bifid—Forked; divided into two parts.
Bilabiate—Two-lipped.
Bract—Modified leaf subtending a flower or belonging to an inflorescence.
Bracteole—A small bract.
Callous—Thickened or hardened in texture.
Calyx—The outermost circle of the floral envelopes, composed of separate or connate sepals.
Campanulate—Bell-shaped.
Canescent—Becoming hoary, usually with a grey pubescence.
Capitate—Shaped like a head or in a head-like arrangement; enlarged or swollen at tip.
Capsule—A dry dehiscent fruit made up of more than one carpel.
Carpel—A simple pistil; one unit of a compound pistil.
Caudate—With a slender, tail-like appendage.
Caudex—The woody base of a perennial plant; the axis of a plant consisting of stem and roots.
Cauline—Pertaining or belonging to the stem.
Cilia—Marginal hairs or hair-like processes.
Ciliate—Fringed with hairs, usually along a margin.

Cinereous—Ash-coloured.

Clavate—Club-shaped; gradually thickened upward.

Cleistogamous—Having fertilization take place within the unopened flower.

Confluent—Flowing into one another; passing by degrees into one another.

Connate—Like parts fused or grown together.

Connective—The portion of the stamen which connects the two "cells" of the anther.

Cordate—Heart-shaped, with special reference to the base of a structure.

Corolla—The inner floral envelope, composed of separate or connate petals.

Corolla-tube—Structure formed by the fusion of the lower portion of the petals of a corolla.

Crenate—Dentate, with teeth much rounded.

Cuneate—Wedge-shaped with the acute angle downward, applied particularly to leaf bases.

Cyme—A usually broad and flattened determinate inflorescence, i.e., with its central or terminal flower blooming earliest.

Deciduous—Not persistent; dropping or being shed at the end of a growing season.

Declined—Bent or curved downward.

Decumbent—Prostrate, but with the growing tip erect or ascending.

Decurrent—Extending downward on a stem and fused with it.

Decurved—To curve or bend down.

Deflexed—Bent or turned abruptly downward.

Dehisce—To open spontaneously when ripe, as seed capsules.

Dentate—Toothed, usually with sharp teeth directed outward.

Denticulate—Minutely toothed on margin.

Didymous—Divided into two lobes; found in pairs as of some fruits; stamens, in two pairs of unequal length.

Diffuse—Loosely branching or spreading; of open growth.

Dissected—Cut or divided into narrow segments.

Distal—End of any structure farthest from the mid-line of an organism or from the point of attachment; the opposite of proximal.

Divaricate—Widely divergent.

Divergent—Inclining away from each other.

Dorsal—Relating to the back, or attached thereto; the surface turned away from the axis; surface farthest from the axis.

Ellipsoid—Solid, but with an elliptic outline.

Elliptic—A flat structure that is oval and narrowed to rounded ends.

Emarginate—With a shallow notch at the apex.

Epipitalous—Borne on the petals.

Erose—Margin ragged as if gnawed.

Explanate—Spread out flat.

Exserted—Projecting beyond, as stamens from a corolla.

Falcate—Scythe or sickle-shaped; flat and curved, tapering gradually to a point.

Filament—Thread-like body; the part of the stamen which supports the anther.

Filiform—Thread-like; long and very slender.

Floriferous—Flower-bearing.

Foliaceous—Leaf-like; said particularly of sepals, bracts, and stipules that look like leaves.

Foliose—Closely clothed with leaves, leafy.

Fusiform—Spindle-shaped; swollen in the middle and narrowing gradually toward each other.

Galea—Helmet-shaped sepal or petal.

Gamopetalous—Having the petals more or less united.

Gibbous—Swollen on one side; a pouch-like enlargement of the base of an organ, as of a calyx or corolla.

Glabrate—Nearly smooth, or becoming so with age.

Glabrous—Smooth; devoid of pubescence and hairs of any sort.

Gland—A secreting surface or structure; any protuberance or appendage having the appearance of such an organ.

Glaucous—Covered or whitened with a "bloom"; bluish-green.

Hastate—Halbert-shaped, sagittate, with the basal lobes turning outward.

Herbaceous—Somewhat thin in texture like an ordinary leaf or frond; not woody.

Hirtellous—Minutely hirsute.

Hirsute—Hairy with stiff or bristly hairs.

Hispid—Beset with stiff or bristly hairs, so rough in texture.

Hispidulous—Somewhat or minutely hispid.

Incised—Sharply and irregularly cut, more or less deeply so.

Included—Not protruding beyond the surrounding organ; not exserted.

Indeterminate—Said of an inflorescence in which the flowers open progessively, from the base upward or from the outside inward.

Inflorescence—Flowering part of a plant, and especially the mode of its arrangement.

Internode—Portion of a stem between adjacent nodes.

Lacerate—Irregularly cleft as if torn.

Lanceolate—Lance-shaped; several times longer than wide, broadest below the middle and tapering to both ends.

Laciniate—Irregularly cut with narrow lobes, as if slashed.

Lanate—Clothed with woolly and interwoven hairs.

Lanose—Woolly.

Limb—The expanded portion of a gamopetalous corolla, above the throat.

Linear—Long and narrow with margins parallel or nearly so.

Lunate—Shape of a half-moon or crescent.

Moniliform—Resembling a string of beads; cylindrical, with contractions at regular intervals.

Mucronate—Abruptly terminated with a sharp tip or point.

Node—Place on a stem at which a leaf or a whorl of leaves normally arises.

Ob-—Prefix indicating inversely or oppositely as in "oblanceolate".

Oblong—Longer than broad, with the margins nearly parallel.

Obtuse—Rounded or blunt at the apex.

Orbicular—Circular.

Oval—Broadly elliptic, with the width greater than half the length.

Ovary—The part of the pistil which contains the ovules.

Ovate—Shaped like the longitudinal section of a hen's egg, the broader end basal.

Ovoid—A solid that is ovate in longitudinal section; egg-shaped in three dimensions.

Ovule—That which becomes a seed after fertilization.

Palate—A rounded projection of the lower lip of some bilabiate corollas, closing the throat.

Paniculate—Having a panicle type of inflorescence or branching.

Papillose—Bearing minute nipple-shaped projections.

Pedicel—An ultimate flower stalk, the support of a single flower.

Peduncle—A primary flower stalk supporting either a cluster or a solitary flower.

Perfect—Said of flowers having both sex organs present and functioning.

Persistent—Remaining attached; not falling off.

Petaloid—Coloured and resembling a petal.

Petiole—The stem of a leaf.

Pilose—With soft hairs; downy.

Pinnate—Feather-like, with the divisions extending fully to the rachis.

Pinnatifid—Pinnately cut; the divisions extending deeply but not all the way to the rachis or midrib.

Pistil—The female organ of a flower when complete consisting of an ovary, style, and stigma.

Procumbent—Prostrate, trailing; lying flat on the ground.

Proximal—Nearest the body or centre or base of attachment; opposite of distal.

Puberulent—Covered with down or fine hair; minutely pubescent.

Pubescent—Covered with short, soft hairs or down.

Punctate—Marked with dots, depressions, or translucent glands.

Raceme—An indeterminate inflorescence consisting of a central rachis bearing a number of flowers of nearly equal length.

Rachis—An axis bearing flowers or leaflets.

Reflexed—Abruptly bent or turned downward.

Regular—Of a flower, radially symmetrical.

Reniform—Kidney-shaped.

Repent—Creeping; prostrate and rooting at the nodes.

Reticulate—Forming a network.

Retrorse—Directed backward or downward.

Rhizome—Underground stem.

Rhombic—Diamond-shaped, with the outline of an equilateral oblique-angled figure.

Rotate—Of a corolla, wheel-shaped; flat and circular in outline.

Rugose—Wrinkled.

Saccate—Bag-shaped; pouch-like.

Sagittate—Enlarged at the base with two acute straight lobes, like the barbed head of an arrow.

Salient—Standing above or beyond the general surface or outline; jutting out.

Scabrous—With short bristly hairs; rough to the touch.

Scape—Leafless peduncle arising from the ground, it may bear scales or bracts and may be one or several-flowered.

Scapose—Bearing or resembling a scape.

Scarious—Thin, dry, and membranous, not green.

Septicidal—Of capsules, dehiscing through the partitions and between the cavities.

Serrulate—Finely serrate.

Sessile—Not stalked.

Spatulate—Spoon-shaped, attached by the narrowed base.

Spicate—Arranged in or resembling a spike.

Spike—An inflorescence consisting of a central rachis bearing a number of sessile flowers.

Stamen—The male, pollen-bearing organ of the flower consisting of anthers (pollen sacs) and filament.

Staminode—Sterile stamen, or a structure resembling such and borne in the staminal part of the flower.

Stigma—The part of the pistil which receives the pollen.

Stipitate—Stalked.

Stipule—One of a pair of appendages borne at the base of the leaf in many plants.

Stolon—A sucker, runner, or any basal branch that is disposed to root.

Stoloniferous—With stolons or runners that take root.

Strict—Very straight and upright.

Strigose—Beset with sharp-pointed, appressed straight and stiff hairs or bristles; hispid.

Style—The more or less elongated part of the pistil between the ovary and the stigma.

Sub-—Prefix denoting nearly, almost, or somewhat, as "sub-opposite", more or less opposite.

Subtend—To stand below and close to, as a bract below a flower or a leaf below a bud.

Subulate—Awl-shaped; tapering to a fine point.

Suffruticose—Very low and woody; diminutively shrubby.

Superior ovary—An ovary with the calyx and corolla inserted below it.

Ternate—Arranged in threes or divided into three segments.

Throat—The opening into a gamopetalous corolla; the place where the limb joins the tube.

Tomentose—Densely pubescent, with matted wool.

Tomentum—A densely matted pubescence.

Thyrse—A contracted cylindrical or ovoid and usually compacted panicle, as a cluster of grapes.

Truncate—Ending abruptly at apex or base, not rounded.

Tuberculate—Bearing small processes or tubercles.

Turgid—Swollen, distended.

Undulate—With a wavy surface or margin.

Ventral—Upper or inner face of a leaf; opposite side to dorsal.

Ventricose—Swelling or inflated on one side.

Verticillaster—A much-condensed cyme with the appearance of a whorl, but in reality arising in the axils of opposite leaves.

Verticillate—Whorled with two or more leaves at a node.

Villous—With long, silky, but not matted, hairs.

Viscid—Sticky.

Whorl—Cyclic arrangement of appendages at a node.

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Metric Comparison Scales

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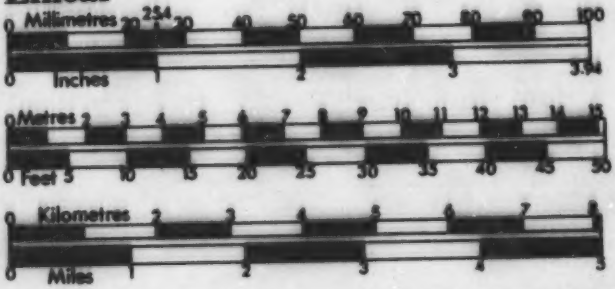

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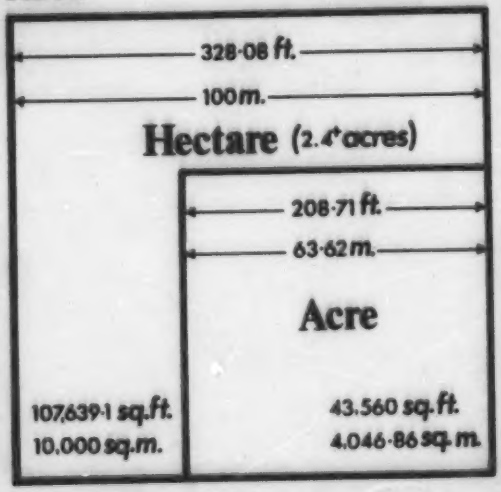
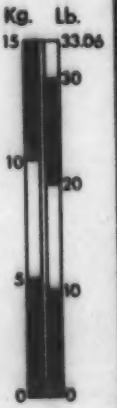
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